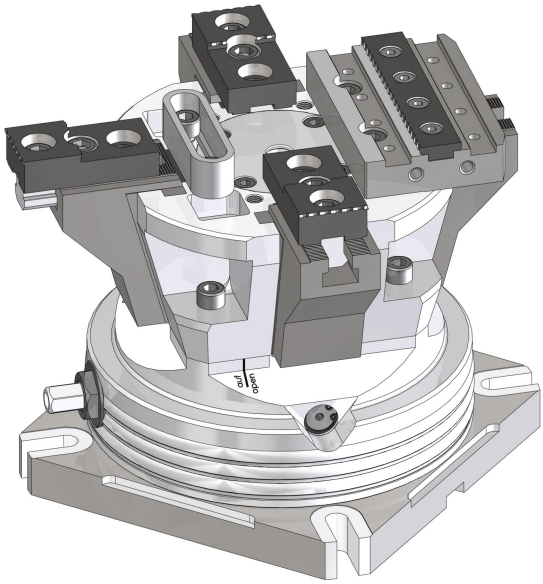
HAINBUCH
SPANNENDE TECHNIK



Installation manual

EN

QUADROK plus

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»Translation of original installation manual«

1 General

1.1 Information about this manual

This manual enables safe and efficient handling of the clamping device.

The manual is a component of the clamping device and must be kept in the immediate vicinity of the clamping device where it is accessible for personnel at all times. Personnel must have carefully read and understood this manual prior to starting all tasks. The basic prerequisite for safe work is compliance with all the safety instructions and handling instructions in this manual.

Illustrations in this manual are provided for a basic understanding and may deviate from the actual model of the clamping device.

It is assumed that the reader is familiar with standard procedures, such as cleaning the mounting surfaces.

1.2 Description of variants

Two variants of the QUADROK plus clamping device are presented in this manual:

- QUADROK plus System size 120
  - manual qm
  - hydraulic qh
- QUADROK plus System size 200
  - manual qm
  - hydraulic qh

If the variants differ in structure, installation, disassembling and maintenance or fault correction, they will be described separately.

Based on the headers, sections and action steps can always be assigned to a specific variant.

Starting with weight 15 kg eye bolts must be used to transport the clamping device.

Usual approaches like a cleaning of the areas for screwing are presupposed to be familiar

1.3 Explanation of symbols

Safety instructions

Safety instructions are indicated by symbols in this operating manual. The safety instructions are introduced by signal words that express the scope of the hazard.

The safety instructions must be strictly adhered to, you must act prudently to prevent accidents, personal injury, and material damage.

DANGER!

… indicates an imminent dangerous situation than can result in death or serious injury if it is not avoided.

WARNING!

… indicates a possible dangerous situation that can result in death or serious injury if it is not avoided.

CAUTION!

… indicates a possible dangerous situation that can result in minor or light injury if it es not avoided.

NOTE!

… indicates a possible dangerous situation that can result in material damage if it is not avoided.

Tips and recommendations

… indicates useful tips and recommendations, as well as information for efficient and trouble-free operation.

1.4 Limitations of liability

All information and instructions in this operating manual have been provided under due consideration of applicable standards and regulations, the current state of technology, as well as our many years of experience.

The manufacturer assumes no liability for damage due to:

- Failure to follow the instructions in the manual
- Non-intended use
- Deployment of untrained personnel
- Unauthorized conversions
- Technical changes
- Use of non-approved spare parts

The actual scope of delivery can vary from the explanations and graphic representations provided in this manual in the case of special versions, if supplemental order options are desired, or on the basis of the latest technical changes.

The agreed obligations in the delivery contract, the general terms and conditions, as well as delivery conditions of the manufacturer, and the statutory regulations valid at the time the contract was concluded, apply.

CAUTION!

Our clamping devices are balanced with balance quality G = 4, in one level n = 1.

The data on the rotation balance refers to rotationally symmetrical work pieces.

The clamping of not rotationally symmetrical work pieces may not be clamped and/or only be clamped after consultation with the manufacturer.

Balancing bolts and balancing weights at the clamping devices may not be removed / disassembled!

1.5 Max. RPM

CAUTION!

The maximum permissible RPM of the clamping device must be redetermined in every application case, on the basis of the clamping forces required for machining.

Of all RPMs of the groups specified, the **lowest given RPM** must always be used.

1.6 Copyright

This manual is protected by copyright and is provided exclusively for internal purposes.

Delivery of the operating manual to third parties, duplication in any form – including excerpts – as well as exploitation and/or communication of the content, are not permitted [except for internal use] without written approval from the manufacturer.

Actions to the contrary make damage compensation mandatory. We reserve the right to enforce additional claims.

1.7 Scope of delivery

All tools and accessories that are not included in the scope of delivery are marked as optional.

In scope of delivery of the clamping device:

- 1 QUADROK plus
- 1 set serrated jaws and T-slot nuts
- 1 pair of work piece supports
- Actuating tool [only for manual actuating]

1.8 Spare parts

WARNING!

Safety risk if the wrong spare parts are used!

Incorrect or defective spare parts can cause damage, malfunction, or total failure; they can also impair safety.

- Only use manufacturer's original spare parts.

Only purchase spare parts from authorized dealers or direct from the manufacturer. Addresses are in the appendix.

1.9 Warranty terms

The warranty terms are included in the manufacturer's terms and conditions.

2 Safety

This section provides an overview o fall the important safety aspects for optimal protection of personnel, as well as for safe and trouble-free operation.

2.1 Responsibility of the customer

The device is used in industrial applications. Consequently the owner of the device is subject to legal industrial safety obligations.

In addition to the safety instruction in this manual, generally valid safety and accident protection guidelines, and environmental protection guidelines must be adhered to and complied with for the area of implementation of the device.

2.2 Personnel requirements

WARNING!

Danger of injury due to insufficient qualification!

Improper handling of the clamping device can cause serious injury or material damage.

- Only have activities performed by personnel who are qualified to perform these activities.

The following qualifications are cited in the operating manual for the various activity areas.

- Specialized personnel
  are personnel who due to their specialized training, skills, and experience, as well as knowledge of the applicable regulations, are capable of executing the tasks assigned to them and of recognizing and avoiding possible hazards on their own.

- **Hydraulic specialist**
  The hydraulic specialist has been trained for the particular task area in which he is active and is familiar with the relevant standards and regulations. Due to his specialized training and experience the hydraulic specialist can perform tasks on hydraulic equipment and recognize and avoid possible dangers on his own.
- **Electric specialist**
  The electric specialist has been trained for the particular task area in which he is active and is familiar with the relevant standards and regulations.
  Due to his specialized training and experience the electric specialist can perform tasks on electric equipment and recognize and avoid possible dangers on his own.

Only persons from whom it can be expected that they reliably execute their work are considered as personnel. Persons whose capability to react is impaired, for instance through drugs, alcohol, or medication, are not approved.

- Comply with age-specific and job-specific regulations that are applicable at the installation site when selecting personnel.

2.3 Intended use

The clamping device is designed for installation in a machine tool. Within the machine tool the clamping device is designed exclusively as a through-bore chuck for bar work and / or as an end-stop chuck for chuck work.

The clamping device should only be mounted, operated, maintained, and cleaned by instructed, specialized personnel.

Intended use also includes compliance with all the instructions in this manual.

The clamping device is to be used for the case of application contractually agreed between the producer/deliverer and the user, as well as such cases of application described in the product description which are also in accordance with the technical values.

The safe function of the clamping device is, as far as it can be foreseen, guaranteed when it is used for the intended purpose in accordance with the appropriate safety regulations.

Any use that extends beyond the intended use, or any other use of the clamping device is considered to be misuse and can cause dangerous situations.

WARNING!

Danger due to misuse!

Misuse of the clamping device can cause dangerous situations.

Particularly refrain from the following uses of the clamping device:

- Use in machines other than machine tools.
- Use in machine tools with technical data other than that specified on the clamping device.

Claims of any type due to damage arising from non-intended use are excluded.

Unintended and improper use of the Power Chuck is for example

- If workpieces are not clamped properly
- If safety regulations are disregarded and persons are working at the Power Chuck without additional protective devices e.g. for machining.
- If a Power Chuck is used for machines or tools for which it is not intended.

2.4 Personal protective equipment

Wearing of personal protective equipment is required to minimize health hazards when working with the device.

- Always wear the protective equipment necessary for the respective task when working with the device.
- Follow the instructions that have been posted in the work area.

Always wear

For all tasks always wear:

Protective work clothing

is tight-fitting work clothing with low resistance to tearing, with tight sleeves, and without projecting parts. It is primarily used to protect against entanglement by moving machine parts.

Do not wear rings, chains, or other jewelry.

Safety footwear

for protection against heavy falling parts and slipping on slippery substrates.

For special tasks wear

Special protective equipment is required when executing special tasks. Separate reference is made to this equipment in the specific sections of this manual. This special protective equipment is explained below:

Hard hat

to protect against falling and flying parts and materials.

Protective goggles

to protect eyes from flying parts and liquid splashes.

Protective gloves

to protect hands from friction, abrasion, puncture wounds, or deeper injuries, as well as from contact with hot surfaces.

2.5 Special dangers

In the following section residual risks are cited that occur due to installation of the clamping device in a machine tool. In each case the residual risks that have been determined based on a risk analysis of the machine must be specified by the customer.

- Follow the safety instructions listed here and the warnings in the other sections of this manual to reduce health hazards and to avoid dangerous situations.

Horizontal / lying parts

WARNING!

Danger of injury due to horizontal parts!

Before transporting the clamping device in horizontal condition:

- Put the clamping device on a non-slip pad
- Screw in the eye bolts

Suspended loads

WARNING!

Life-threatening danger due to suspended loads!

Some clamping devices must be lifted with a crane. When lifting the clamping device there is a life-threatening hazard due to falling parts or parts swinging out of control.

- Never step under suspended loads.
- Comply with the instructions concerning the intended attachment points. Ensure that the sling gear is securely seated!
- Do not attach lifting gear in projecting components.
- Only use approved hoists and sling gear with sufficient bearing capacity.
- Do not use rope and belts that are torn or frayed.

Moving parts

WARNING!

Danger of injury due to moving parts!

Rotating parts of the clamping device can cause serious injuries.

- Do not reach into moving parts or handle moving parts during operation.
- Note the gap dimensions of moving parts.
- Do not open covers when the device is in operation.
- Be aware of afterrun time:
  Prior to opening the covers ensure that all parts have come to a standstill.
- Wear tight-fitting protective work clothing in the danger zone.

Wrong clamping of the work piece

WARNING!

Danger of injury due to incorrect clamping of the work piece!

Incorrect work piece clamping may lead to the ejection of the work piece and result in serious injuries.

Under dimensioned (tolerance) parts can lead to incorrect clamping!

- Check the unmachined work pieces at random on dimensional accuracy.

Too low supply pressure can lead to the reduction of clamping force!

Too high supply pressure can lead to damage of the components of the clamping device!

- Check and adjust, if necessary, the supply pressure regularly.
- Do random checks of the unmachined work pieces on dimensional accuracy.

Missing changing parts

WARNING!

Danger of injury due to missing changing parts!

When operating the clamping device without changing parts [segmented clamping bushing, clamping heads, work piece end-stops] there is a higher danger of crushing injuries due to the stroke of movable components of the clamping device.

- The clamping process may not be initiated without assembled segmented clamping bushing and/or work piece end-stop.

Parts with sharp edges

WARNING!

Risk of injury!

When screwing in individual components such as for example work piece end-stops, threaded adapters and similar devices that are equipped with an external thread or wear caused by burrs, there is risk of cutting.

- The operation must be done only by qualified personnel.
- Wearing of gloves / [PSA] is required!

2.6 Further warnings

WARNING!

Risk of injury!

Never start rotating the clamping device without a clamped work piece.

- For operation any available clamping position must be clamped with a suitable work piece.

WARNING!

Risk of injury!

Never reach for the clamping device while the spindle is rotating. Before starting to work on the mandrel, make sure the machine spindle cannot be put in motion.

WARNING!

Risk of injury!

Falling down of the clamping device or its parts can cause severe bruises and fractures.

The dead weight of the clamping device or its parts can lead to high physical stress.

WARNING!

Risk of injury!

By repeated reworking or wear and tear of the clamping surfaces sharp edges and burrs may appear and lead to severe cutting damages.

WARNING!

Risk of injury!

Missing o-rings or seals may cause severe injuries!

Due to missing / fallen out O-rings and seals compressed air or hydraulic fluids which are under high pressure may expel!

- Make sure that all O-rings / seals for the hydraulic / pneumatic connections are available and undamaged!
- If necessary lubricate them before assembly and/or during service.

WARNING!

Damage of clamping device!

The clamping device may be released exclusively in the standing condition!

Risk of injury!

Leaking [sprayed out] hydraulic oil can cause serious injury.

- Make sure that all O-rings / seals for the hydraulic and/or pneumatic connections are available and undamaged

2.7 Clamping force

The achieved clamping force can vary due to the maintenance condition of the clamping device [state of lubrication and degree of contamination] [see chapter »Maintenance«].

The clamping force must be checked at regular intervals. This requires the use of static clamping force measuring devices.

CAUTION!

Damages due to excessive draw and compressive force!

An excessive draw force and/or compressive force may damage the clamping device.

- The max. draw force and compressive force may not be exceeded.

2.8 Screws

Moving parts

WARNING!

Danger of injury due to screws and stud screws being accelerated out of the device!!

Screws and stud screws radially attached to the product can be accelerated out of the device and cause severe injuries.

- At the product radially mounted screws and stud screws which were loosened for assembly and maintenance must be re-tightened with the correct tightening torque!
- The tightening torque is shown in the assembly drawing of the product or it is engraved on the device itself in the direct vicinity of the screw or stud screw.
- All screws or stud screws that are not marked with a tightening torque specification are tightened with the prescribed tightening torque and locked [medium-strength bonding] in the factory and should only be unscrewed after consultation with the manufacturer. If in doubt you must contact the manufacturer immediately do determine the subsequent procedure.

2.9 Functionality

NOTICE!

With high contamination of the clamping device the functionality is no longer guaranteed.

- The cleaning and maintenance intervals must be observed.

2.10 Environmental protection

NOTE!

Environmental hazard due to incorrect handling!

Incorrect handling of environmentally hazardous substances, particularly improper disposal, can cause significant environmental damage.

- Always comply with the instructions cited below
- If environmentally harmful substances should inadvertently get into the environment, initiate suitable measures immediately. If in doubt notify the responsible municipal authority about the damage.

The following environmentally harmful substances are used:

Lubricants

Lubricants like greases and oils can contain toxic substances. Ensure that they do not get into the environment.

The device must be disposed of by a specialized disposal company.

To achieve trouble-free operational performance of the clamping device only use HAINBUCH lubricants. See the appendix for reference addresses.

3 Technical data

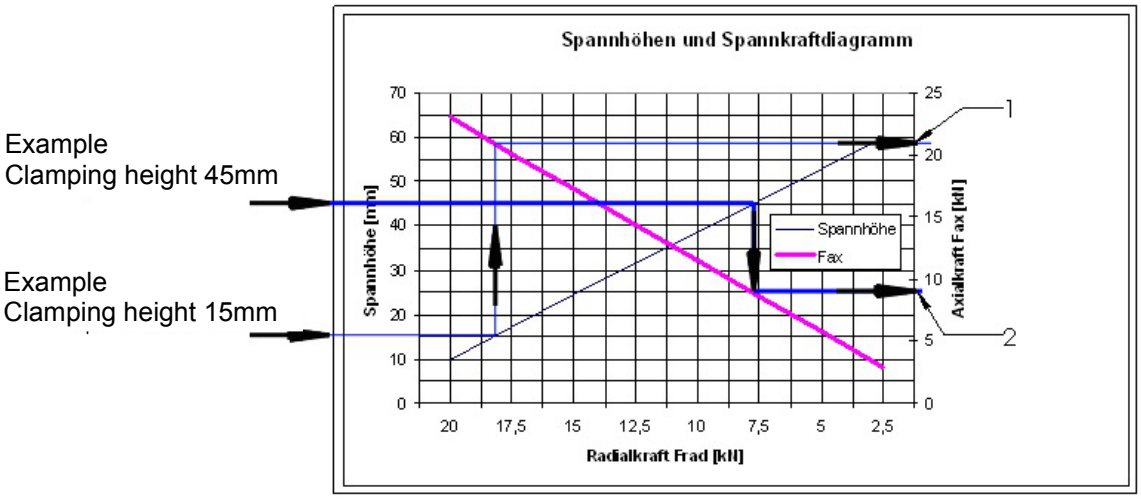
3.1 General information

3.1.1 Size 120

Size	Variant	Weight clamping device [kg]	Weight [kg] Spindle flange	Clamping unit [kg] Weight	Dimensions Clamping unit [length x width x height in mm]	[Ø in mm] Spindle flange connection	[1/min] Speed max.	Clamping force max. [kN] [Refer to clamping height]	Actuating force max.
120	QUADROK S120 mx dock manual	34,5	27,5	7	230x230x206	250	-	20	65 Nm
120	QUADROK S120 mx dock hydraulic	29,5	22,5	7	220x220x196	250	-	20	2,3 Mpa / 23 bar

Utilization of the diagrams

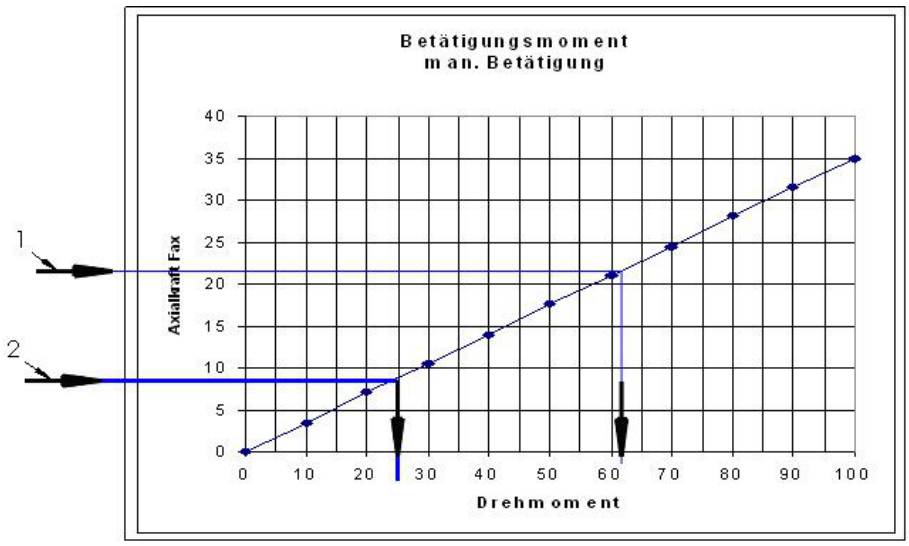
Clamping height and clamping force diagram



Based on the clamping height go horizontal to the right from the leading edge of the clamping device [here e.g. 45 mm] till the thin line [clamping height], then search upwards or downwards for the intersection with the thick line [F_{ax}].

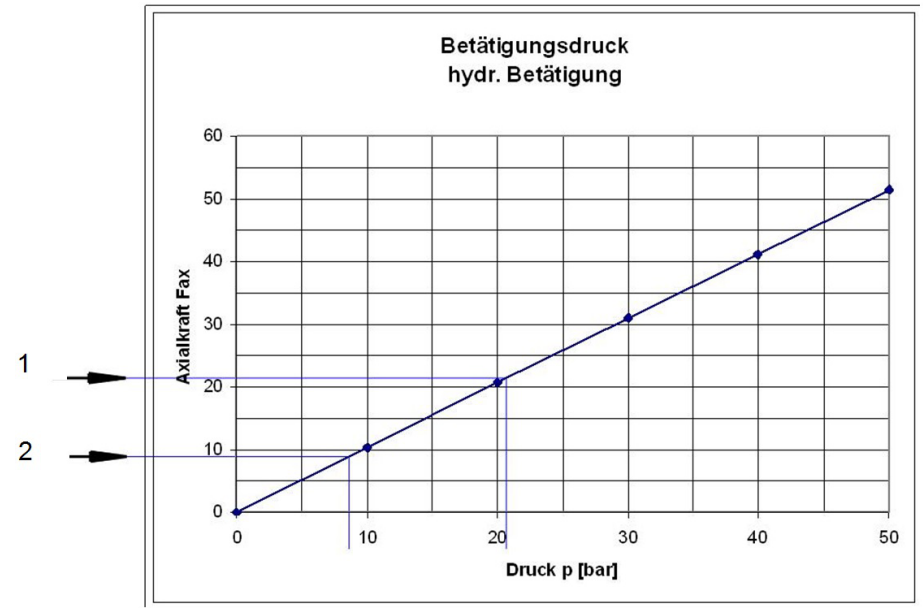
If you follow further to the right you can read the maximum permissable axial force for this clamping height. Because of strength this value may not be exceeded!

Actuating torque – manual actuating

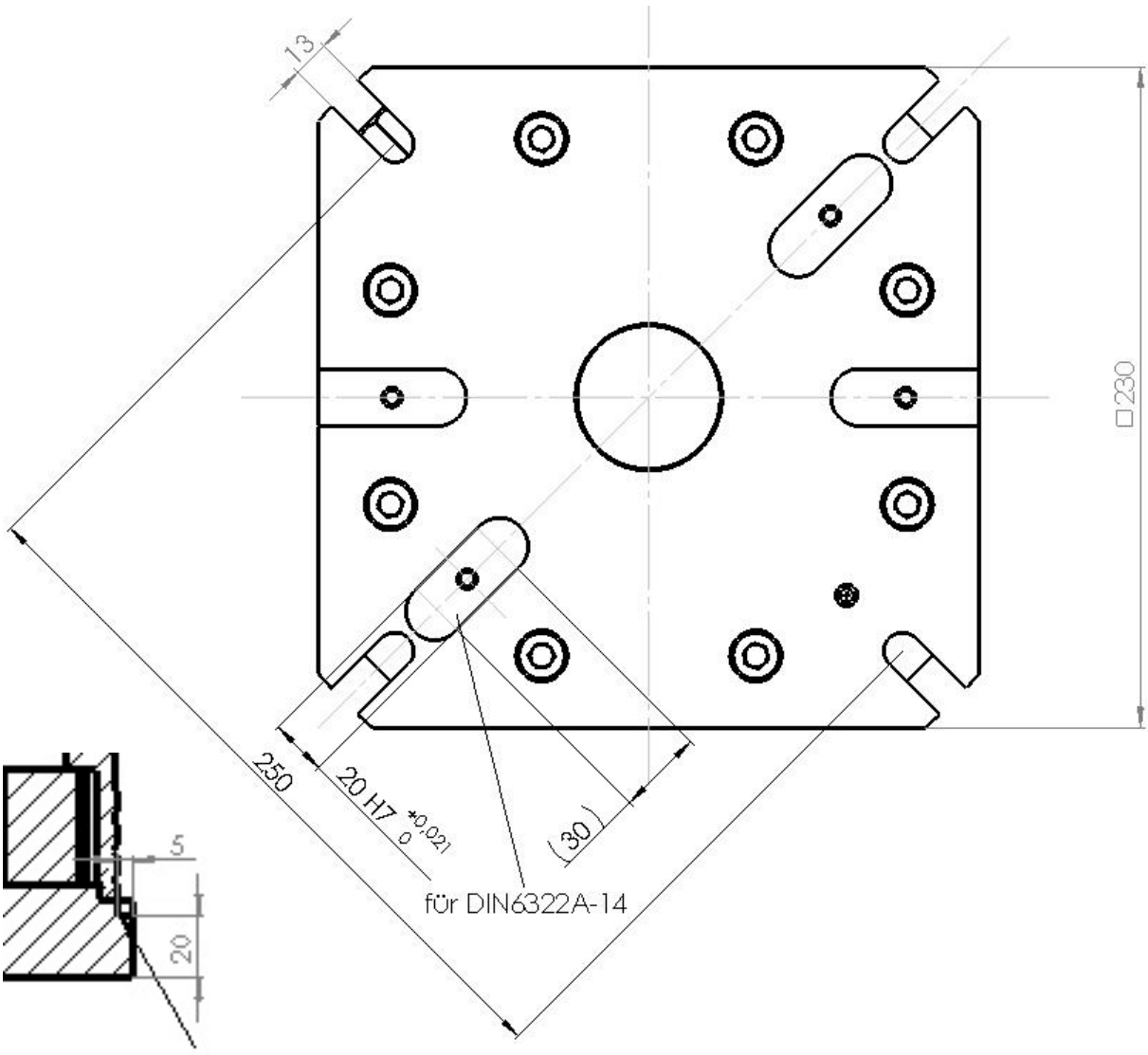


Based on the read value [here e.g. 9 kN] go in the second diagram on the y axis horizontal to the intersection. Now you can read the necessary torque for this axial force [here: 25 Nm].

Actuating torque – hydraulic actuating



Based on the read value [here e.g. 9 kN] go in the second diagram on the y axis horizontal to the intersection. Now you can read the necessary pressure for this axial force [here: 8 Nm].



Clamping edge for clamps

For clamping set-up you can use the feather key grooves for DIN6322A. They can clamp axially parallel or diagonal.

3.1.2 Size 200

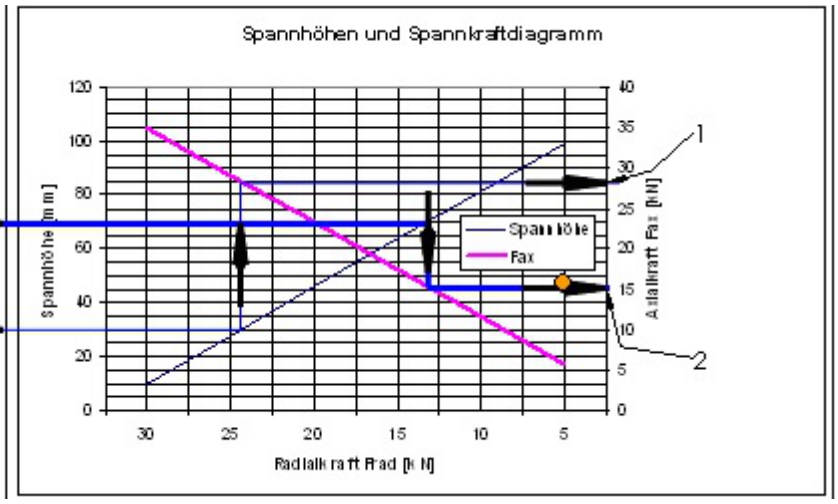
Size	Variant	Weight clamping device [kg]	Weight Spindle flange [kg]	Weight Clamping unit [kg]	Dimensions Clamping unit [ø x length in mm]	Spindle flange connection [Ø in mm]	[1/min]Speed max.	Clamping force max. [kN] [Refer to clamping height]	Actuating force max.
200	QUADROK S200 mx dock manual	45	28	17	Ø 267x201	110	-	30	100 Nm
200	QUADROK S200 mx dock hydraulic	40	23	17	Ø 267x191	110	-	30	4,5 Mpa / 45 bar

Utilization of the diagrams

Clamping height and clamping force diagram

Example
Clamping height 70mm

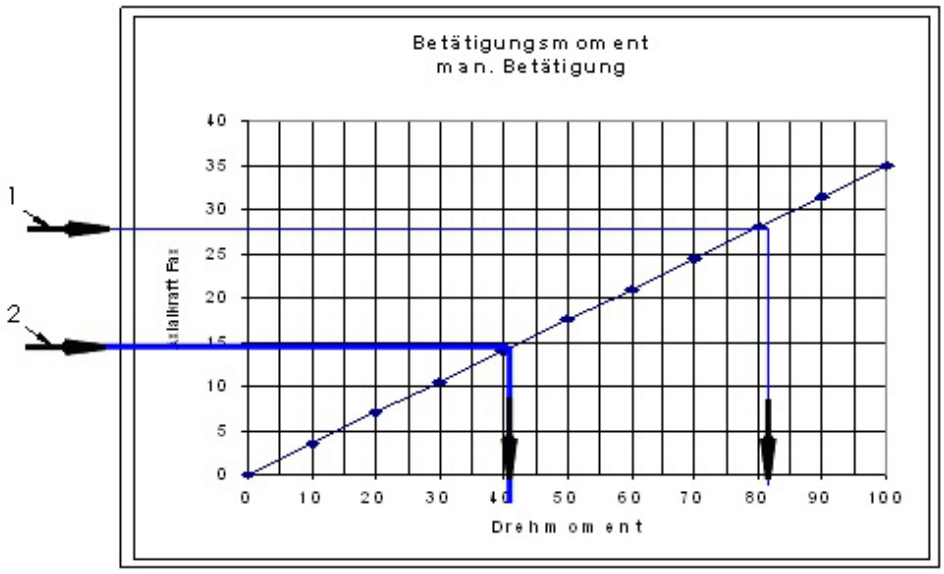
Example
Clamping height 30mm



Based on the clamping height go horizontal to the right from the leading edge of the clamping device [here e.g. 30 mm] till the thin line [clamping height], then search upwards or downwards for the intersection with the thick line [F_{ax}].

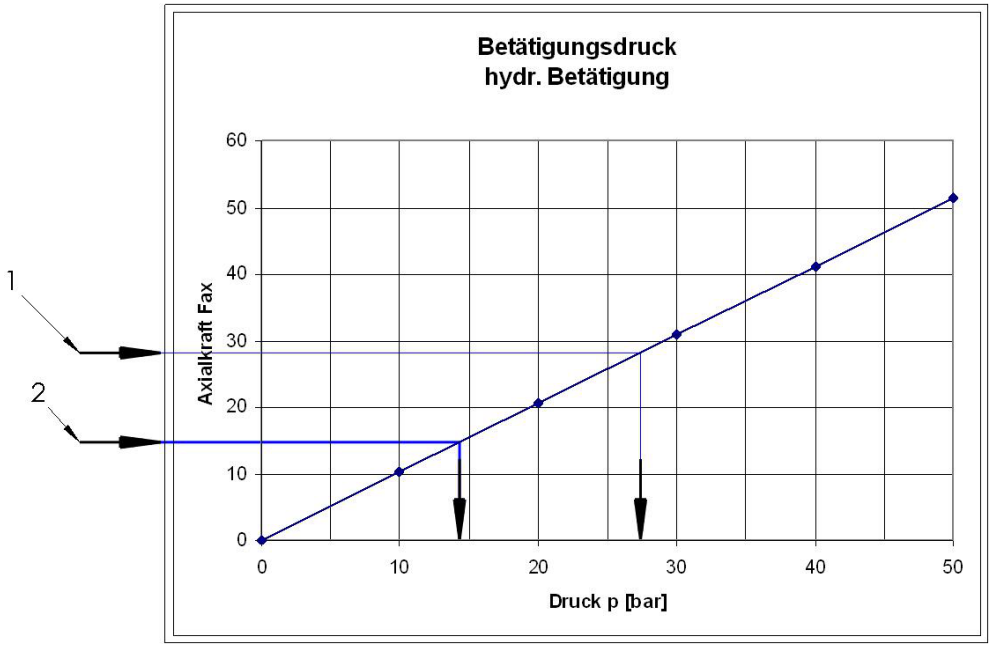
If you follow further to the right you can read the maximum permissable axial force for this clamping height. Because of strength this value may not be exceeded!

Actuating torque – manual actuating



Based on the read value [here e.g. 28 kN] go in the second diagram on the y axis horizontal to the intersection. Now you can read the necessary torque for this axial force [here: 81 Nm].

Actuating torque – hydraulic actuating



Based on the read value [here e.g. 28 kN] go in the second diagram on the y axis horizontal to the intersection. Now you can read the necessary actuating pressure for this axial force [here: 27 Nm].

3.2 Clamping force diagram

In the diagrams, the effects of friction and the clamping diameter are included.

NOTE!

The measured values for the radial clamping force F_{rad} may not leave the permitted area. Under optimal conditions, the values for F_{rad} are below the top, in bad conditions above the lower limit.

- If the measured clamping forces are outside the allowed range, the maintenance is mandatory to perform. After servicing, the clamping forces have to be re-examined.
- If the clamping force even after the maintenance is not in the permitted area please contact the manufacturer.

Example for size 42/52:

With an axial force F_{ax} of 25 kN the radial clamping force F_{rad} is, depending on the maintenance state of the clamping device, in the range between 22 kN and 66 kN; it must not be smaller than 22 kN or higher than 66 kN.

3.2.1 Clamping force diagram – size 42/52

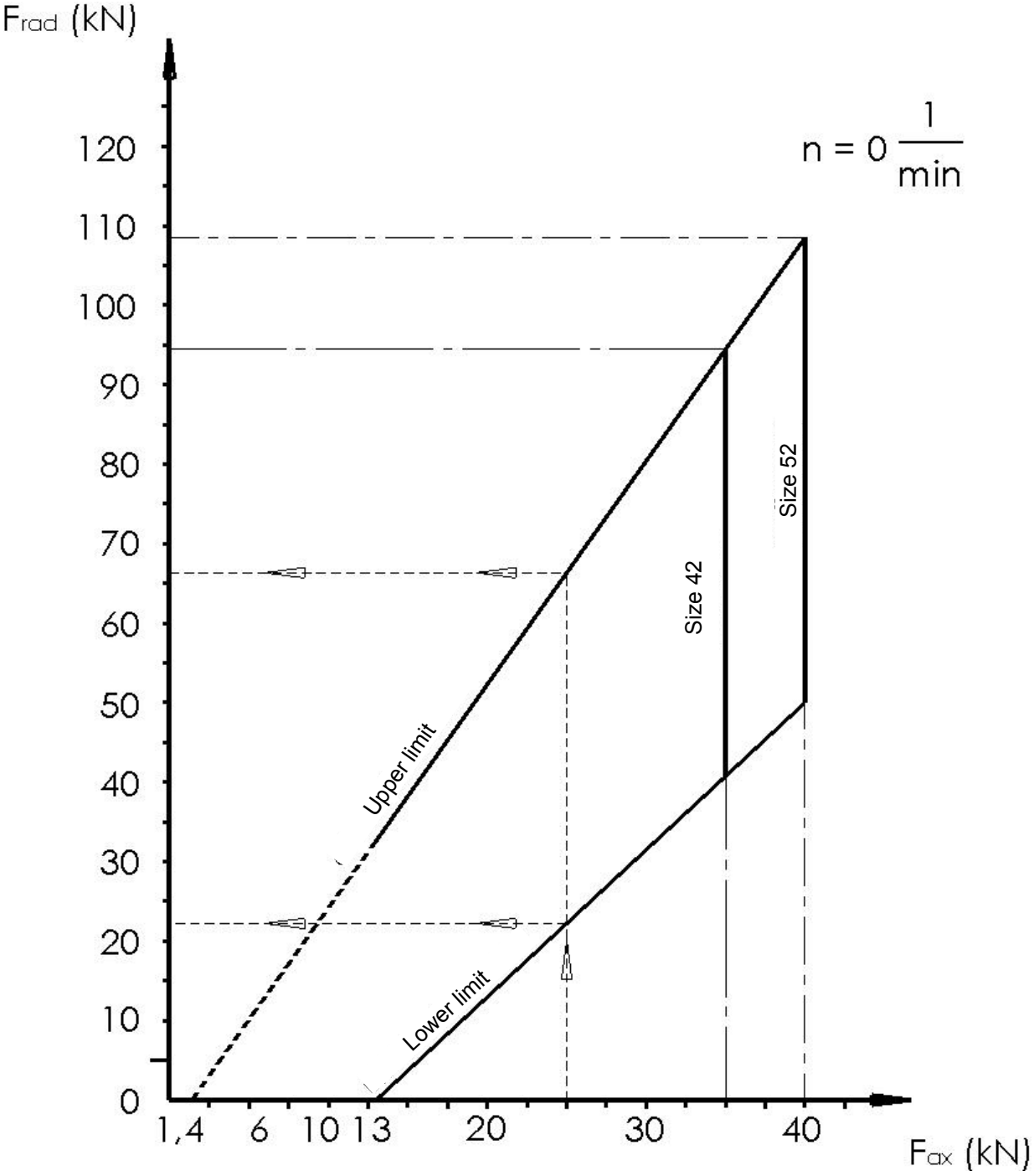


Fig. 1

3.2.2 Clamping force diagram – size 65/80

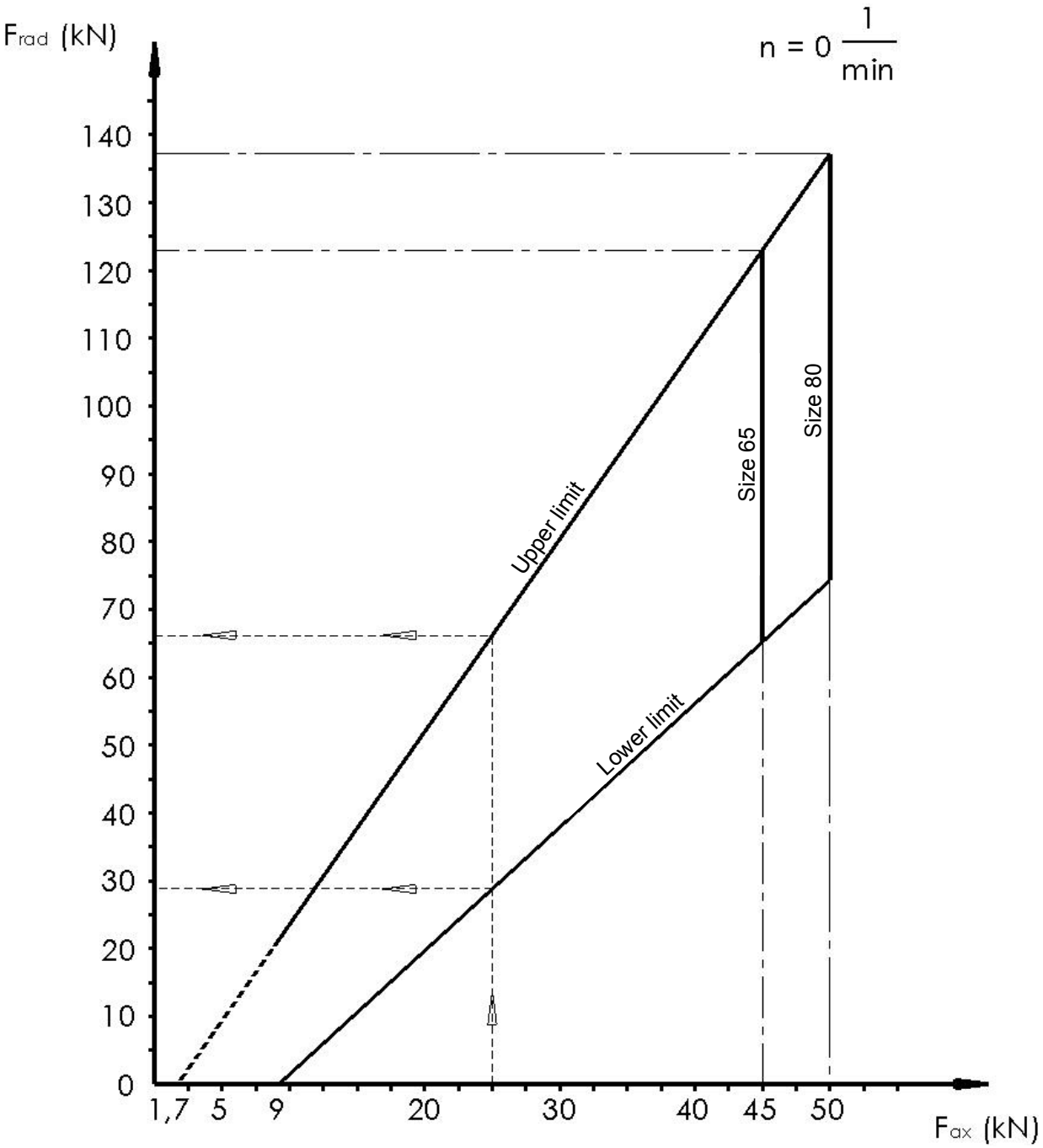


Fig. 2

3.2.3 Clamping force diagram – size 100/125

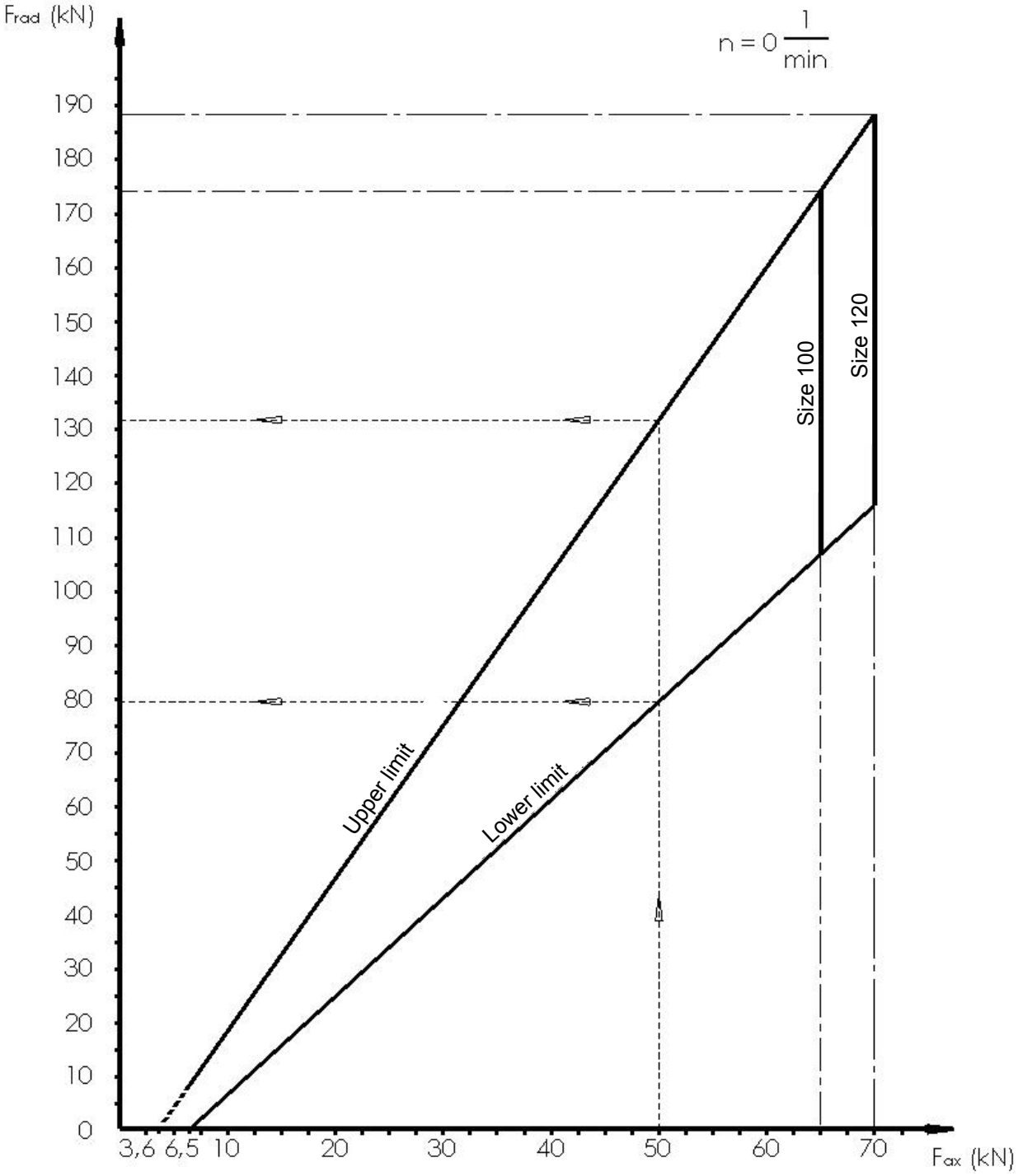


Fig. 3

3.2.4 Clamping force diagram – size 140/160

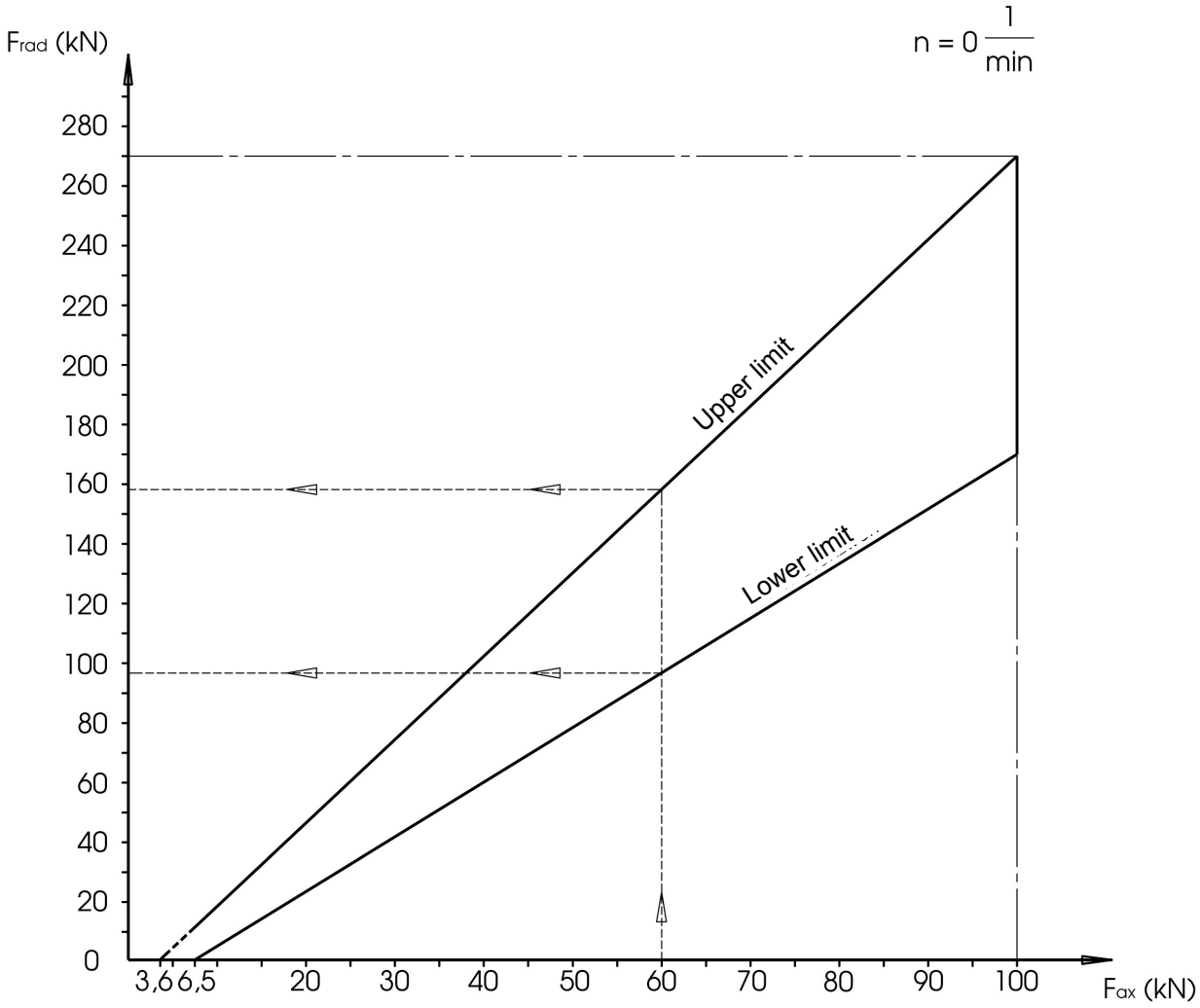


Fig. 4

3.3 Operating conditions

Environment	**Specification**	**Value**	**Unit**
	Temperature range	15 - 65	°C
Mechanical actuating	In each possible operating condition the maximum draw force and compressive force may not be exceeded!		

3.4 Power specifications

NOTE!

Material damage if the power specifications do not agree!

If the power specifications of clamping device, machine adapter and machine do not agree, severe damage extending to total damage can occur.

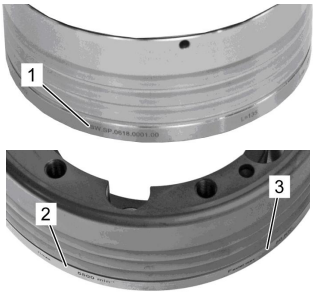
- Only operate clamping devices and adapters in machines with the same power specifications.

Information on maximum clamping force and draw tube force is provided on the clamping device and the adapter.

3.5 Dimensional sheet

Dimension sheets for the respective product can be requested from HAINBUCH.

3.6 Type designation



The type designation is on the product and includes the following information:

1 ID no. [marked with the # symbol]
2 Maximum speed [rpm]
3 Maximum clamping force [kN]

Fig. 5

4 Structure and function

4.1 Overview mechanical actuation

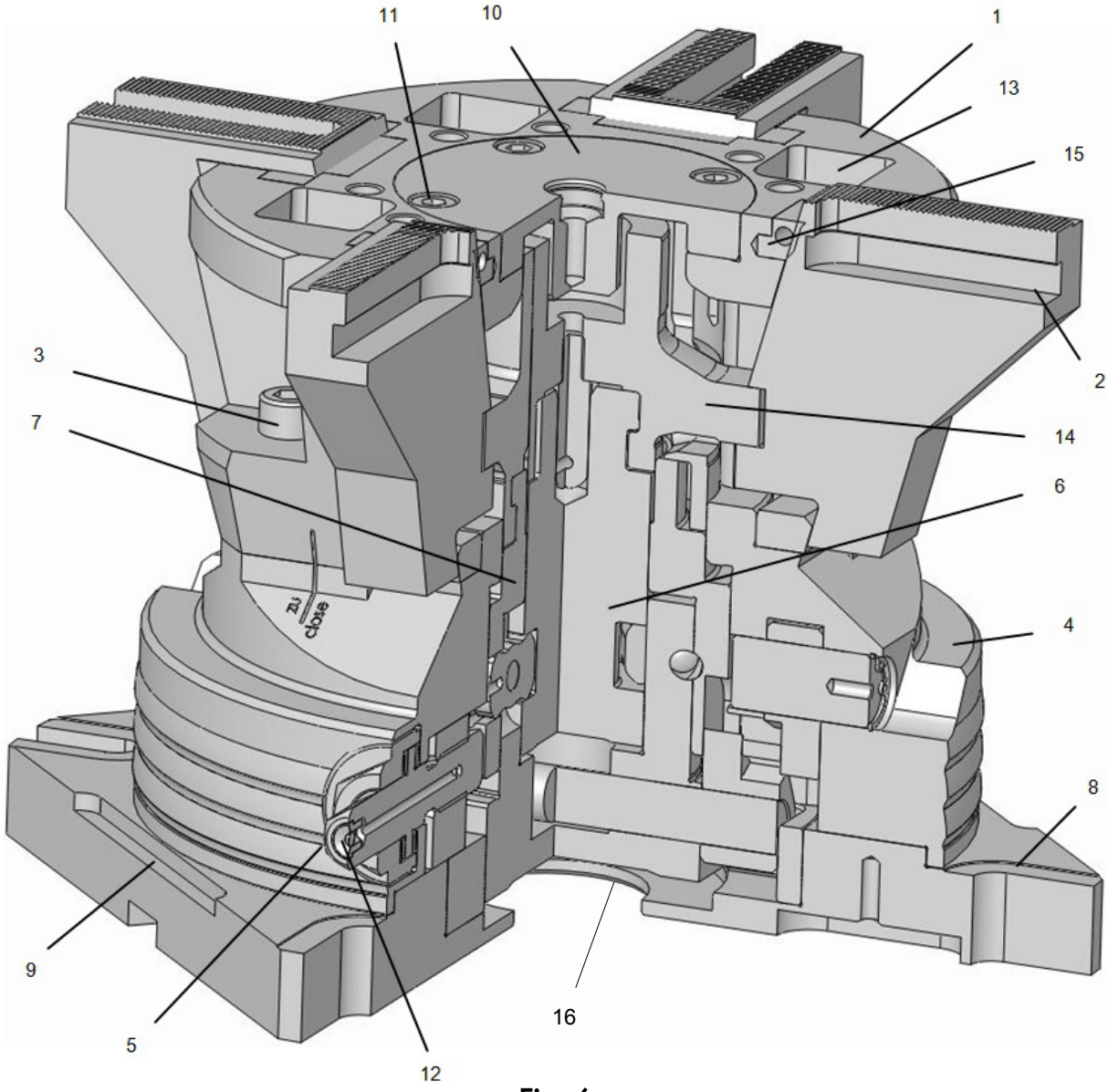


Fig. 6

1. Clamping unit
2. Pointed splined base jaws with T-slot
3. Cylindrical screw clamping unit
4. Actuating unit qm dock
5. Actuating hexagonal SW15
6. Bayonet coupling 1 qm dock
7. Bayonet coupling 2 qm dock
8. Surface for screws
9. Clamping edge for clamps
10. Base end-stop
11. Base end-stop screw
12. Lubricating nipple
13. Opening for fix jaws
14. Bayonet adapter
15. Seal
16. Fitting bore

4.2 Overview – hydraulic actuation

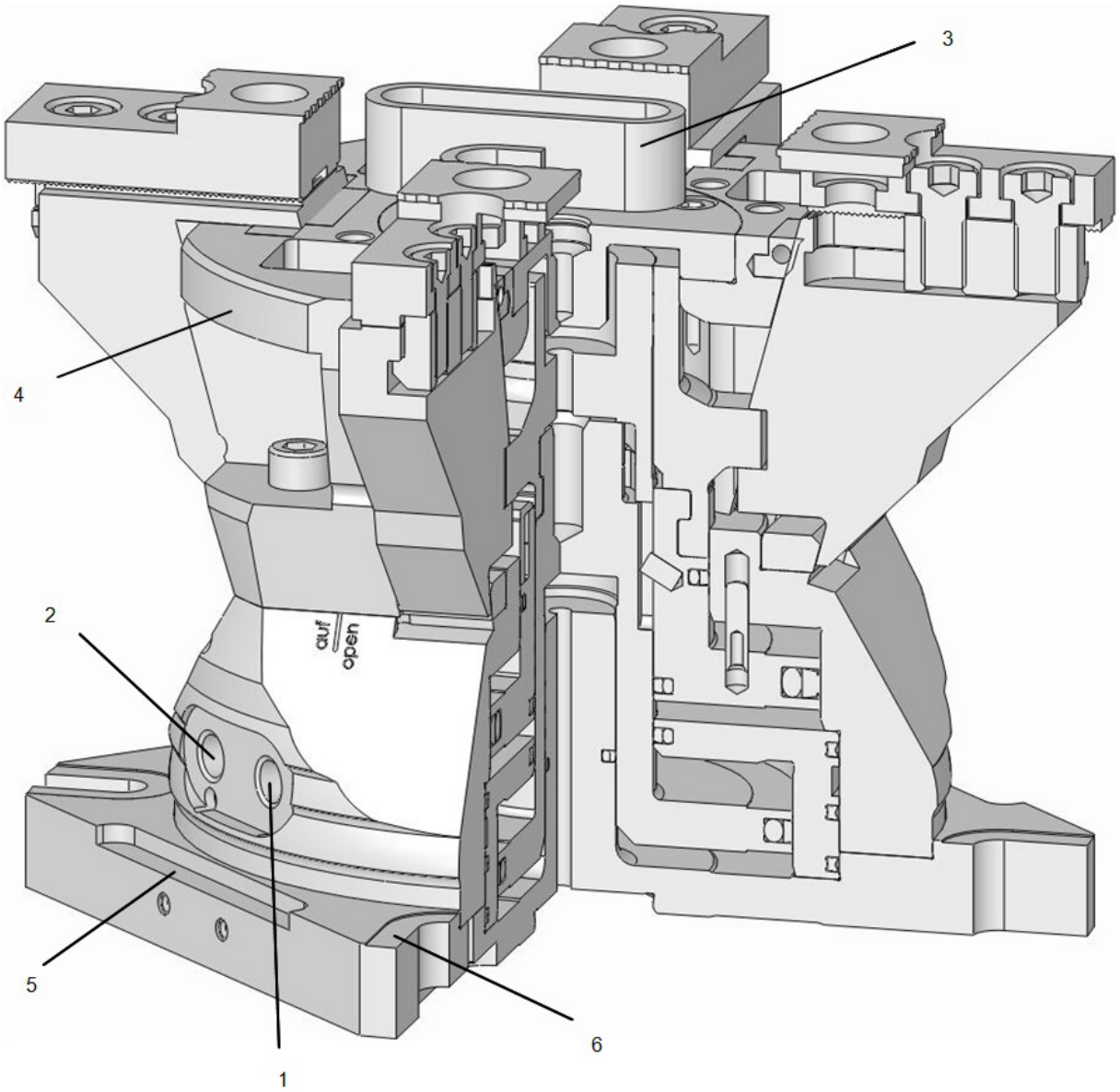


Fig. 7

1. Connection thread G ¼ – loosening
2. Connection thread G ¼ – clamping
3. Bayonet coupling 1 mh dock
4. Bayonet coupling 2 mh dock
5. Surface for screws
6. Clamping edge for clamps

Note the maximum pressure settings of each size.
With increasing pressure reduction may occur – depending on the power pack – to extensions of the clamping time.

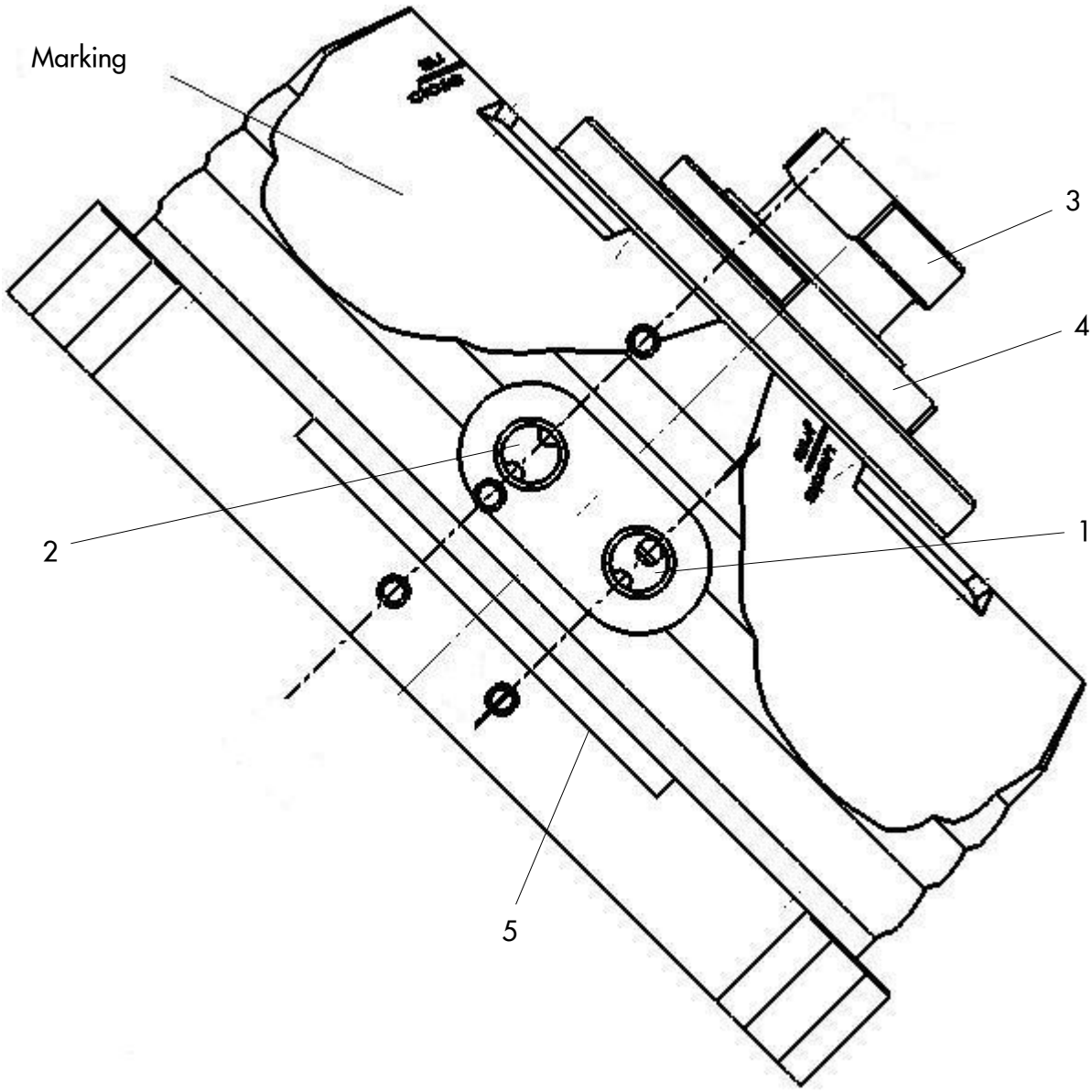


Fig. 8

1. Connection thread G ¼ – loosening
2. Connection thread G ¼ – clamping
3. Bayonet coupling 1 mh dock
4. Bayonet coupling 2 mh dock
5. Surface for screws
6. Clamping edge for clamp

Note the maximum pressure settings of each size.

With increasing pressure reduction may occur – depending on the power pack – to extensions of the clamping time.

4.3 Brief description

The QUADROK plus is an end-stop chuck.

The QUADROK plus is not appropriate as an internal clamping device.

As an end-stop chuck the clamping device can be used for several different applications:

- Vise:
  One pair of jaws is removed. The second pair of jaws has one mobile and one tight jaw. The mobile jaw presses the work piece on the tight jaw.
- Centric clamping vise:
  One pair of jaws is disassembled, the second pair of jaws centers the work piece.
- Double-vise:
  Of each pair of jaws only one jaw is assembled. In both dimensions the work piece is pressed on a tight jaw.
- Centric clamping vise and vise:
  From one pair of jaws only one jaw is assembled and presses the work piece on a tight jaw.
  The second pair of jaws centers and clamps the work piece.
- Double centric clamping vise:
  With both pairs of jaws the work piece can be centered and clamped.

In case of need the base end-stops can be replaced by further models. Therefore release the QUADROK plus from the actuating unit by loosening the 4 mounting screws. Move the actuating unit into release position and lift the QUADROK plus out of the bayonet locking.

Please note the markings for the bayonet position!

Rotate the QUADROK plus by 90° till the marking »CLOSED«, then move the actuating into reserve position. By the 4 positioning cones the QUADROK plus is positioned for repeat accuracy.

The changing of the jaws is necessary for:

- changing the model of the master jaws
- changing the size of the QUADROK plus [S120 / S200] or assembling additional clamping devices [e.g. SPANNTOP chuck or mandrel]
- changing the actuating unit [hydraulic /manual]

Adjusting the clamping range

By the serration of the master jaws 1/16"x90° the width of the jaws can be adjusted in steps of 1.5875 mm. Thereby the jaws of each pair of jaws should be adjusted from a reference edge [e.g. the back edge of the master jaws], on which it is measured. If the jaws can not be shifted similar the work piece can not be centered correctly.

The stroke of the jaws effects axially and radially, so the tolerance of the work piece influences directly the axial position of the jaws.

When using the tight jaws remove the profile jaws and put in the tight jaws into the housing by the two end-stop ashlars. By the grooves the combi clamping inserts can be assembled as required.

The positions of the end-stop bars are variably movable and positional. Make sure that they are not in the moving range of the master jaws!

4.4 Possibilities of clamping

The QUADROK plus is a 4-side clamping vise that positions a work piece with high accuracy and clamps powerful. All movable jaws can be replaced with a fixed jaw.

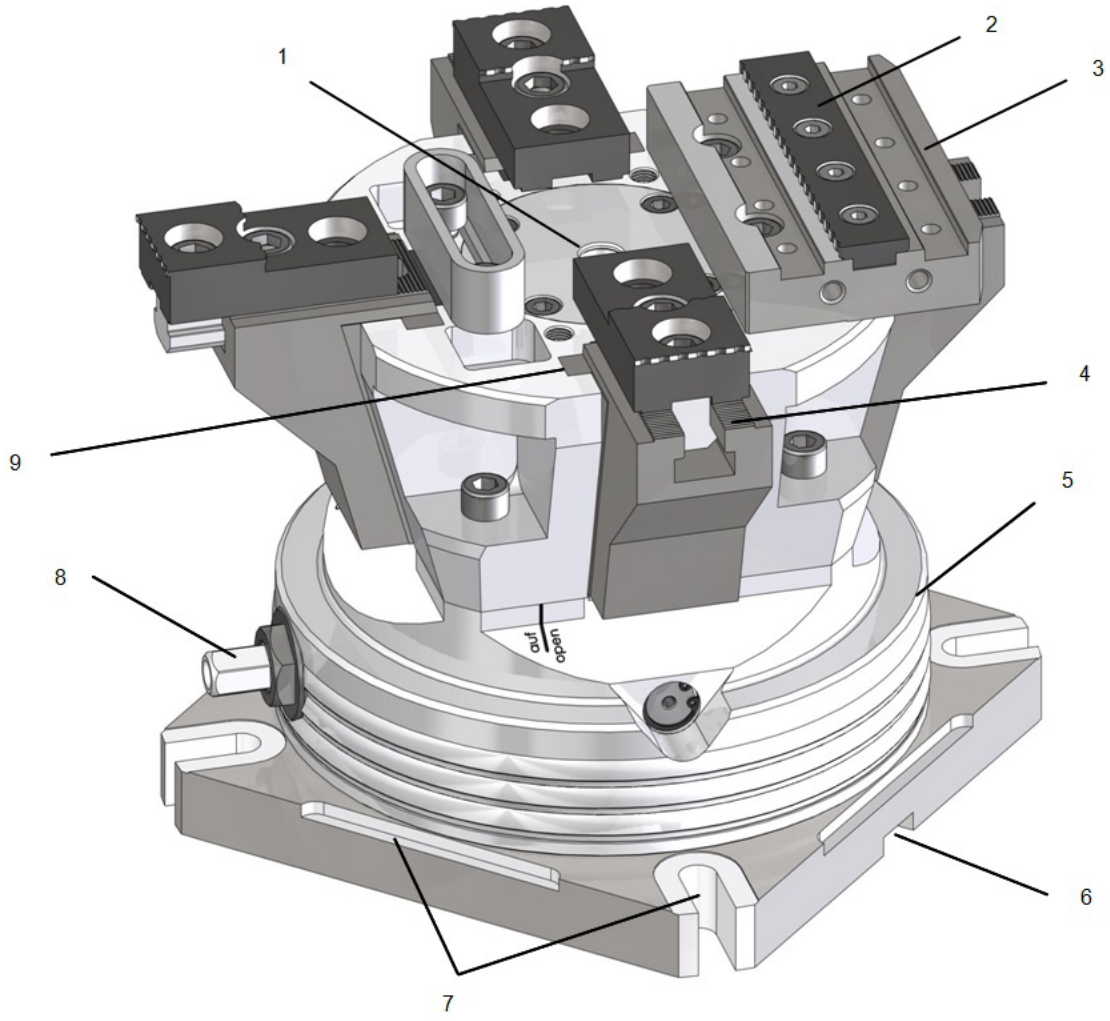


Fig. 9

1. Thread and fit for depth end-stop
2. Combi clamping insert with serrated and smooth clamping area
3. Tight master jaws with positive connection to the housing
4. Standard serration
5. Chip protected driving mechanics
6. Aligning possibilities: fitting groove and fitting bore [not visible, included centered in basic plate]
7. Clamping possibilities: clamping shoulder and groove for direct screw fitting
8. Actuating unit, manual qm dock, hydraulic qh dock
9. High-precision guide for clamping accuracy wear protection

4.5 Accessories in scope of delivery

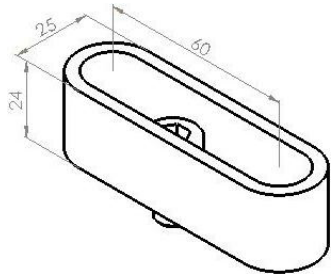


Fig. 10

4.5.1 Work piece support

2x work piece supports with 2 screws M10.

The work piece support can also be mounted with 1 screw for each bead. The support plate must be positioned in a way that the work piece bears on it straight.

Note: the stroke of the jaws [stroke direction] may not be blocked!

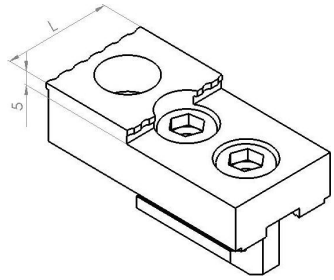


Fig. 11

4.5.2 Profile jaws with T-slot nuts

4x profile jaws, clamping edge 5 mm [in clamping position: 3.5 mm] above the work piece end-stop.

Adjustable clamping range [80 to 250 mm].

For concentric clamping the pairs of jaws must be adjusted similar.

Variable width B.

4.6 Optional Accessories

The accessories described here are not included in the scope of delivery.

Specially developed segmented clamping bushings match to the respective maximum RPM are available for each clamping device. Trouble-free and precise function of HAINBUCH clamping devices is only ensured when using original HAINBUCH segmented clamping bushings.

Lubricating grease and grease gun are required for cleaning and preservation of the clamping device. The lubricating grease is also specially matched for protection of the vulcanized segments of the segmented clamping bushings and increase their service life and elasticity by a significant factor.

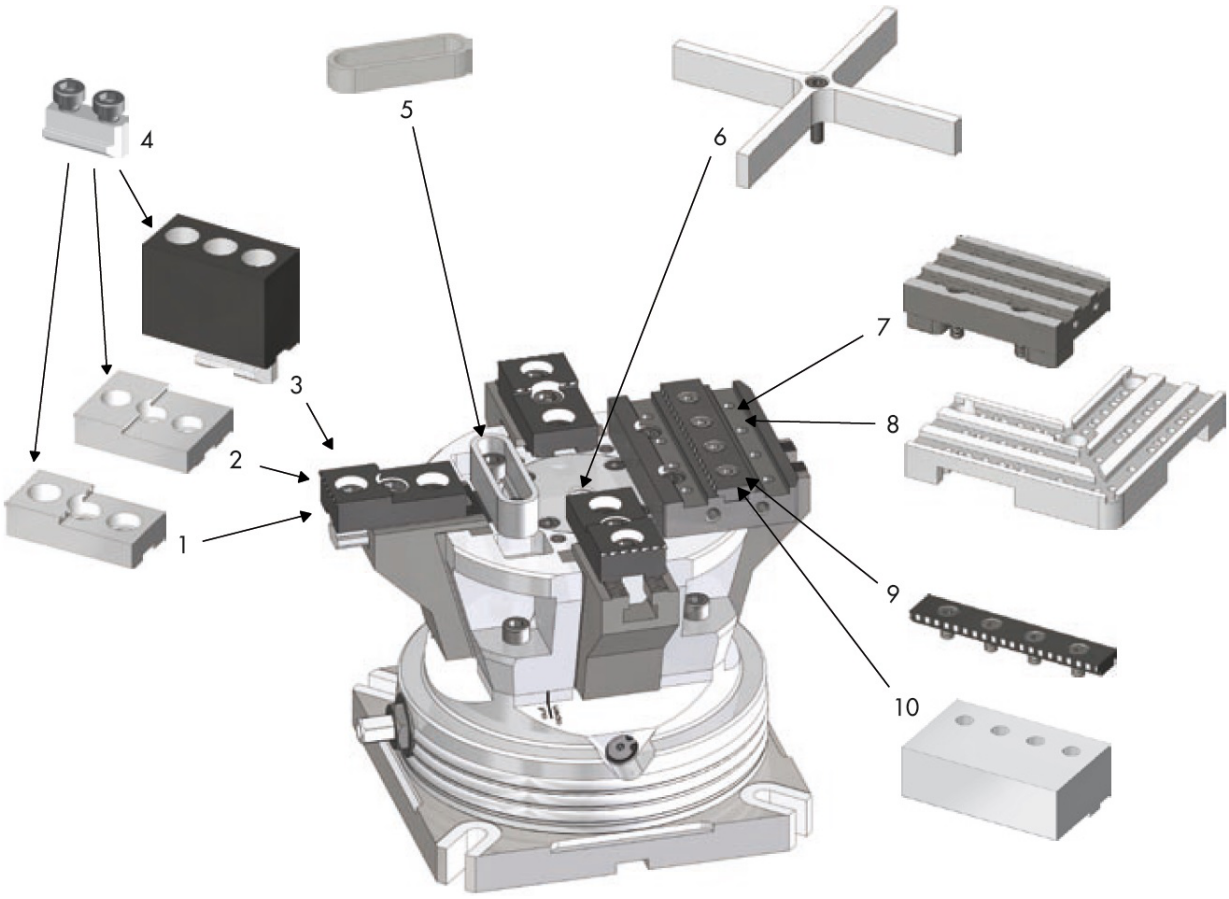


Fig. 12

1. Serrated jaw
2. Smooth jaw
3. Soft jaw
4. T-slot nut
5. Work piece support
6. Cross stop
7. Fixed master jaw
8. Fixed corner master jaw [only for size 120]
9. Combination clamping insert
10. Soft top jaw

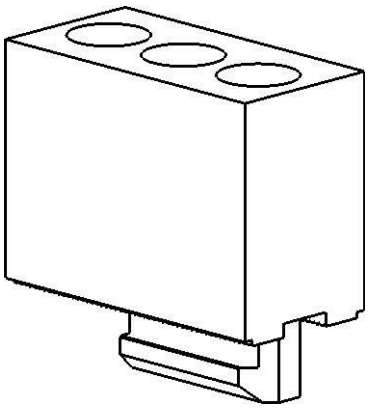


Fig. 13

4.6.1 Soft jaw

Soft jaws to build of your own outline.
Model in 16MnCr5 / ALCuMgPb-F40 soft.
Variable width B.

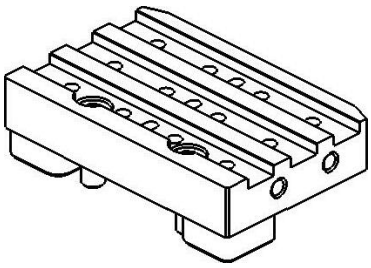


Fig. 14

4.6.2 Tight jaw

Tight jaws for vise operation.

The tight jaw is hung up to the QUADROK plus with his tappets and screwed with the screws M10. Into the grooves combi clamping insert can be screwed. The threads on the side are provided for the end-stop screw.

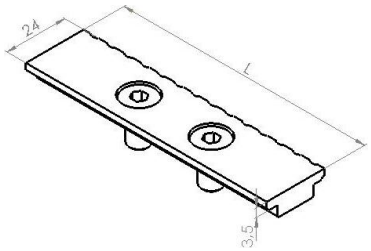


Fig. 15

4.6.3 Combi clamping insert

Optional to the tight jaws.

Variable length L.

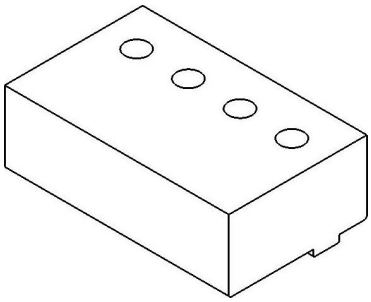


Fig. 16

4.6.4 Soft top jaws for tight jaws

Advantage of the soft top jaw:

- Building your own outline
- Adaption to the tight jaw
- Centered positioning by a cylindrical pin to reach repetition accuracy.
- Model 16MnCr5 / ALCuMgPb-F40 soft

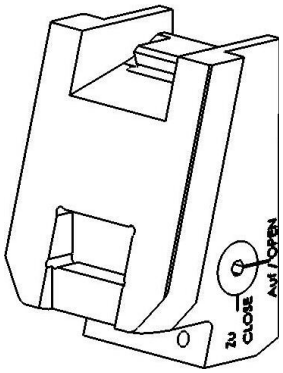


Fig. 17

4.6.5 Quick-change master jaw

Master jaw with quick change operation.

Caution: special clamping jaws with quick-change operation are requested!

Changing the jaws by simple turning the locking bolt and unmounting and/or mounting the appropriate chuck jaw.

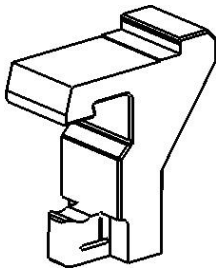


Fig. 18

4.6.6 Quick-change chuck jaw

Possible in several different and/or customer specification.

Available only on request.

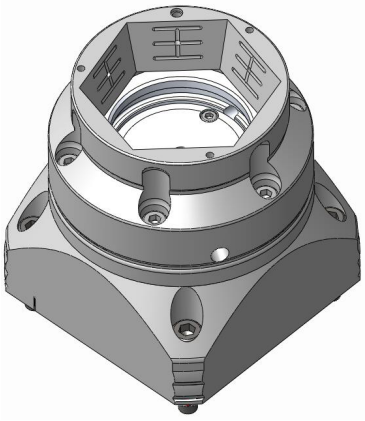


Fig. 19

4.6.7 Chuck SPANNTOP and TOPlus

Chuck is possible in different and/or customer specific variants.

Available only on request.

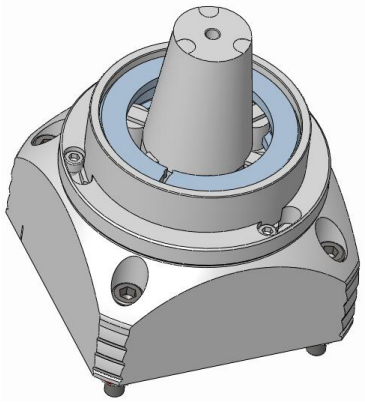


Fig. 20

4.6.8 Mandrels Mando and Mando Adapt

Mandrel is possible in different and/or customer specific variants.

Available only on request.

4.6.9 Grease

Fig. 21

The universal grease for chuck and mandrel lubrication is supplied in a 1000g can. The order number for the universal grease is 2085/0003; it can be ordered from HAINBUCH.

4.6.10 Grease gun

Fig. 22

The grease gun is filled with universal grease, which is pressed into the clamping device. The grease gun has a pointed mouthpiece. The order number for the grease gun is 2086/0004; it can be ordered from HAINBUCH.

4.6.11 Key

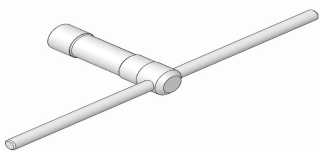


Fig. 23

The key has the order number 10684/0001; it can be ordered from HAINBUCH.

5 Transporting, packaging, storing

5.1 Safety instructions for transporting

Unbalanced package

WARNING!

Danger of falling due to an unbalanced package

Packed goods can have an unbalanced package. If attached incorrectly the package can tip and cause life-threatening injuries.

- Note the markings on the packages.
- Attach the crane hook in such a manner that it is located above the center of gravity.
- Carefully lift and see if the load tilts. If necessary change the attachment.

Transport!

- For transport always use a suitable clamping means / crane.
- Make sure that a rolling / falling of the clamping device is not possible.

5.2 Symbols on the packaging

Fragile

Identifies packages with fragile or sensitive contents. Handle the packed goods with care; do not allow them to fall, and do not subject them to impact.

Protect from moisture

Keep packed goods dry and protected against moisture.

5.3 Transport inspection

Check delivery immediately upon receipt to ensure that delivery is complete and to identify any transport damage.

Proceed as follows it there is apparent external damage:

- Do not accept the delivery, or only accept it with reservation.
- Note the extend of transport damage on the transport documents or on the transport company's delivery ticket.
- Submit a complaint.

Report any defect as soon as it is detected. Claims for damage compensation can only be enforced during the applicable periods for giving notice of lack of conformity.

5.4 Unpacking and inner-company transport

Usually the clamping device is packed vertically. Depending on the size it has threaded bores in the circumference of the clamping device for assembling the eye bolts.

In these threaded bores lifting eye bolts can be screwed in.

To safely lift the clamping device out of the package it must be hooked into a crane depending on the weight.

For transporting with transport trolley the clamping device must be positioned in standing condition. Make sure that a non-slip pad has been laid.

All tools and accessories which are not in scope of delivery are marked as optional in the operating instructions.

- Two people are required for this task.
- Special tools required:
  - Crane from weight 15 kg
  - Lifting eye bolts

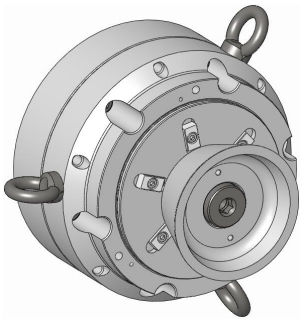


Fig. 24

1. Screw lifting eye bolts into the thread in the circumference of the clamping device.
2. Hook the load-handling equipment into the lifting eye bolts.
3. Use a crane to carefully lift the clamping device out of the transport packaging and put it down on a stable, level substrate.
4. Prevent the clamping device against rolling away.

5.5 Packaging

About the packaging

Individual packages are packed according to the expected transport conditions. Environmentally-friendly materials have been used exclusively for the packaging.

Packaging should protect the specific components from transport damage, corrosion, and other damage until installation. Therefore do not destroy the packaging, remove it just before installation.

The packed goods are sealed in foil airtight and packed in cartons. See the »Technical Data« section for the specific weight of the respective sizes.

Handling packaging materials

Dispose of packaging materials in accordance with the respectively valid statutory regulations and local guidelines.

NOTE!

Improper disposal causes environmental damage!

Packaging materials are valuable raw materials and in many cases they can be reused, or they can be effectively treated and recycled.

- Dispose of packaging materials in an environmentally responsible manner.
- Comply with locally applicable disposal guidelines. If necessary commission a specialized company to dispose of packaging.

5.6 Storing

Under certain circumstances instructions for storage and subsequent storage are affixed to the packages that extend beyond the requirements cited here.
Comply with these instructions accordingly.

Storage of packages

Only store packages under the following conditions:

- Do not store outdoors.
- Store in a dry and dust-free location
- Do not expose to aggressive media
- Protect from direct sunlight
- Avoid mechanical vibration
- Storage temperature: 15 bis 35 °C
- Relative humidity: max. 60 %
- For storage periods longer than 3 months:
  - Check the general condition of all parts and the packaging at regular intervals.
  - Touch up or re-apply anti-corrosion agents as needed

Subsequent storage of the clamping device

Only re-store the clamping device under the following conditions:

- Thoroughly clean the clamping device prior to subsequent storage [see section »Cleaning«]
- Thoroughly oil and grease the clamping device. [see section »Cleaning«]
- Store the clamping device in airtight foil
- The clamping device must be stored securely in position. If this is not guaranteed, use a suitable container for the clamping device or equip the shelf with a circumferential securing edge.

6 Assembly

WARNING!

During the initial installation of the clamping device severe injuries may occur.

- The initial installation must be done only by qualified personnel.
- All screws remaining in the clamping must be tightened firmly.
- All tools and keys must be removed after installation.

WARNING

Risk of injury due to stored energy!

The clamping device can be designed with disc springs. These disc springs are under permanent tension! The release of the stored energy can cause injuries!

- By loosening the corresponding screws they have to be operated continuously alternately to reduce the clamping pressure to a minimum!
- Particularly cautious approach is required!
- For cleaning and maintenance disassemble the clamping device from the machine!
- Always wear personal protective equipment!

6.1 Pre-consideration

- Screws are tightened according to the size of the screw and the general torque.
  To avoid axis-parallel warpage under load and to get stiffness turn in the screws evenly.
- To avoid precision error clean the screw joint surfaces and also the mating surfaces (see service instructions).
  The ex works wetting of the plate surfaces and the clamping element is only corrosion protection. It's not functionally lubricated.
- The insertion of lubricant is provided only on the mechanical surfaces. Pay attention to the instructions for lubricants in the chapter »Maintenance«.
- Avoid too much lubricant on the bearing surface, as this can cause face runout.
  Avoid lubricant between the clamping element (clamping head, segmented clamping bushing) and the guiding cone, as this can cause concentricity error and face runout.
- Seal rings (e.g. o-ring, quad-ring seal) and sealing surfaces must be lubricated.
  Note the information in the chapter »Maintenance«.
- Note that the function surfaces (plate surface, mating surface, cone surface and seal surface) may not be damaged.

CAUTION!

Wear safety shoes during the assembly and maintenance work.

Make sure that the starting of the spindle is impossible.

6.2 Preparations

The total weight of the clamping device, consisting of spindle flange and clamping unit, depends on the size and can be as much as 43 kg.

Depending on the weight, to safely lift the clamping device out of the package and position it in the machine it must be hooked into a crane.

WARNING!

Danger of injury due to falling components!

When mounting components can fall and cause severe injury and material damage.

- Two people are always required for this task.
- From weight 15kg use a crane.

- Special tools required:
  - Allen wrench
  - Oil stone
  - Crane
  - Eye bolts

6.3 Installation

WARNING!

Danger of injury due to unintentional startup of the tool spindle!

Unexpected start up of the tool spindle can cause severe injury.

- Prior to switching on automatic mode close all protective doors or hoods that are present on the machine tool.
- Unscrew all ring nuts from the clamping device and remove them from the interior of the machine.
- Only run the machine in set-up mode or jog mode.
- Always remove immediately all the tools and wrenches from the clamping device after use.

WARNING!

Risk of injury!

By operating the clamping device without changing parts [clamping head, segmented clamping bushing, work piece end-stops ...] there is an increased risk of crushing injuries by the stroke of the moving components of the clamping device.

By uncontrolled discharge of the clamping process [e.g. by incorrect installation of the energy supply or faulty programming] there is an increased danger.

WARNING!

Risk of injury!

Bending in the working area of the machine can cause severe head injuries!

Risk of injury!

Material damage due to unintentional start-up of the tool spindle!

Unexpected start up of the tool spindle can cause severe injury.

- Make sure that the system is pressure-free and that a restart of the machine can be excluded!

Risk of injury!

Contamination of the mechanism can influence/reduce the stroke, thus the clamping force is reduced and thus, the work piece is not properly tightened and can be thrown out.

- Clean the product regularly [see chapter »Maintenance and service«].

Risk of injury!

If the clamping pressure is too low clamped work piece may be thrown out.

If the clamping pressure is too high severe damages of the components of the clamping device may occur the throwing out of the work piece.

- Before operation set the operation pressure back to operation level.
- The operating pressure should be checked and adjusted regularly!
- The dimension of the work pieces should be checked regularly [clamping-ø]!

Transport!

- For transport always use a suitable clamping means / crane.
- Make sure that a rolling / falling of the clamping device is not possible.

WARNING!

Danger of injury due to vertical suspended spindle!

Bending into the machine work are when assembling overhead can cause severe head injuries.

- Secure components prior to overhead assembly.
- For assembly on a vertically suspended spindle always use a suitable mounting aid.

6.3.1 Assembling the clamping device

NOTE!

Material damage due to the wrong tightening torque of the allen screws in the spindle flange!

The tightening torque of the allen screws is prescribed by the spindle or machine manufacturer. Incorrect tightening torque of the allen screws in the spindle flange can cause significant material damage on the clamping device and on the machine.

- Only tighten the allen screws of the spindle with the torque prescribed by the spindle or machine manufacturer.

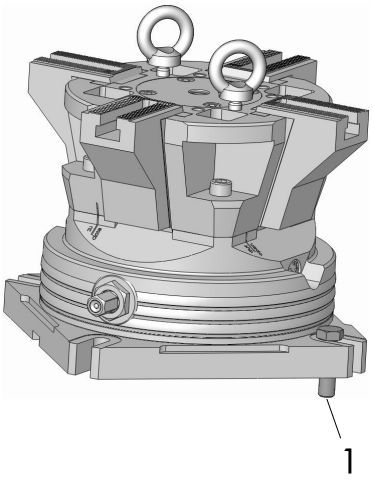


Fig. 25

Two people are required for this task.

Special tools required:

- Crane from weight 15 kg
- Allen wrench

1. Put the machine in set up mode.
2. Wipe off the mating surfaces of the machine table with a soft, lint-free cloth and remove all oil and grease residues.

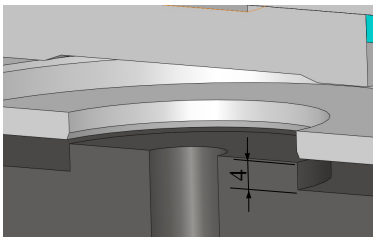


Fig. 26

NOTE!

Positioning by centering bolt.

If the centering is done with a centering bolt, make sure that the diameter of the bolt extends max. 4 mm into the QUADROK plus. [The fitting bore in the actuator unit has a diameter of 50 H7.]

3. Lift the clamping device by using the crane and put it on the machine table.
4. Screw all allen screws [1] into the T-slut nuts in the machine table with an allen wrench and hand tighten in a cross pattern.

6.3.2 Assembling the jaws

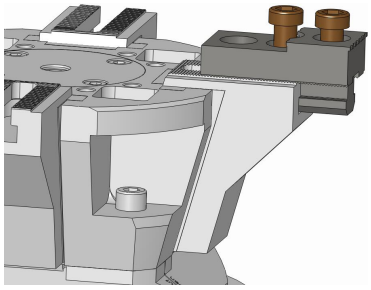


Fig. 27

- Special tools required:
  - Allen wrench

The distances of the jaws to the central axis must be the same!

The serration of jaws and base jaws must gear into each other!

1. Push each opposing pair of jaws from the outside to the base jaws.
2. Tighten the screws with the correct tightening torque.

6.3.3 Assembly of the chuck

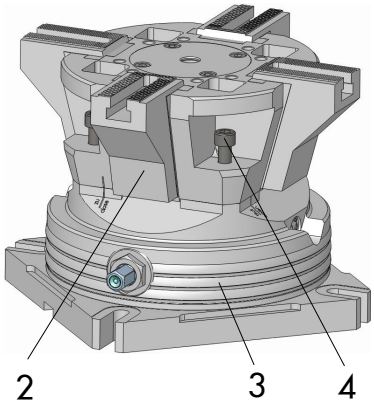


Fig. 28

- Special tools required:
  - Allen wrench

For the assembly of the chuck the QUADROK plus clamping unit [“] must be separated from the standard draw unit [3].

1. Remove the cylindrical screws [4].
2. Remove the QUADROK plus clamping unit [2].

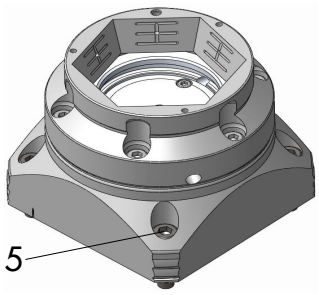


Fig. 29

3. Put the chuck on the standard draw unit [3].
4. Screw in the cylindrical screws [5] and tighten them firmly.

6.3.4 Assembly of the mandrel

- Special tools required:
  - Allen wrench

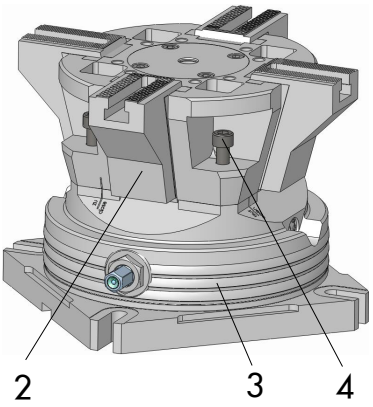


Fig. 30

For the assembly of the mandrel the QUADROK plus clamping unit [2] must be separated from the standard draw unit [3].

1. Remove the cylindrical screws [4].
2. Remove the QUADROK plus clamping unit [2].

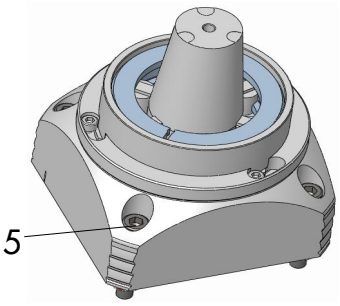


Fig. 31

3. Put the mandrel on the standard draw unit [3].
4. Screw in the cylindrical screws [5] and tighten them firmly.

WARNING!

Risk of injury!

Tools and gages that are thrown out of the machine can cause injury.

- Remove all tools and gages from the working area of the machine before the machine is started up.

Risk of injury!

If the clamping pressure is too low clamped work piece may be thrown out.

If the clamping pressure is too high severe damages of the components of the clamping device may occur the throwing out of the work piece.

- Before operation set the operation pressure back to operation level.
- The operating pressure should be checked and adjusted regularly!

WARNING!

Slipping danger due to escaping hydraulic fluid!

Escaping (sprayed out) hydraulic oil can cause serious injuries.

- Make sure that all o-rings/seals for the hydraulic / pneumatic interfaces are available and in undamaged condition.
- Make sure that the clamping device is empty and leakage of hydraulic fluid is avoided.

6.4 Work piece

WARNING!

Risk of injury due to thrown out parts!

During clamping of the work piece and the processing parts can be thrown and cause severe injuries and property damage.

- Check the clamping diameter of the work piece.
- Tighten only work pieces that meet the dimensional requirements.
- For clamping very long work pieces use in addition a tailstock / a steady rest for support.
- Do not exceed the maximum clamping pressure.
- Make sure that the correct supply pressure [neither too high nor too low] is set.

CAUTION

Risk of injury!

When placing the work piece:

- Make sure that the hands / fingers may not be clamped between the flange and the work piece!

6.5 Inspections

NOTE!

Material damage due to damaged clamping devices!

A damaged, incomplete, or unbalanced clamping device can significantly damage or even destroy the machine tool and the work piece.

- Only install undamaged, complete, and precisely balanced clamping devices.
- If in doubt contact the manufacturer.

Ensure the following points prior to each installation and start-up of the clamping device:

- All allen screws of the clamping device must be present and tightened with the proper tightening torque.
- The balance screws of the clamping device must all be present and undamaged.
- All rubber segments must be intact; this means that they are neither torn, nor are they porous at any point.
- All edges and bearing surfaces are intact; this means that they are neither broken nor do they show any signs of wear.
- The set speed of the machine tool should not exceed the maximum permissible speed of the clamping device.
- The maximum draw tube force specified on the perimeter of the clamping device must not be exceeded.
- The clamping pressure of the machine must be sufficiently high.

- All mounting tools must be removed from the interior of the machine.
- Clamping device and work piece must be compatible – check the clamping diameter regularly.
- The work piece must be clamped into the clamping device with sufficient work piece tension.
- Do a pressure loss test and a measurement of clamping force.

6.6 Control of the stroke position

WARNING!

Crushing danger from moving parts!

Crushing danger from moving parts during controlling the stroke position!

Gaps, caused while controlling the stroke position, can cause severe injury.

- Only do the controlling of the stroke position with assembled changing parts.
- Only run the machine in set-up mode or jog mode.

6.7 Activities after production is concluded

1. Move the clamping device into unclamped position.
2. Switch off the machine tool and safeguard it from being switched on again.
3. Open the protective door or hood.
4. Clean the clamping device of chips and production residues with a soft, lint-free cloth.
5. Close the protective door or hood.

7 Disassembly, subsequent storage, disposal

If there is break in production that lasts longer than 3 days, the clamping device must be disassembled and properly stored in accordance with the manufacturer's specifications [see section »Transport, packaging, storage«].

Prior to disassembling:

- Put the machine in set up mode.
- Remove fuels and auxiliary materials, as well as residual processing materials and dispose of these items in an environmentally-responsible manner.

7.1 Safety

Safeguarding against restart

DANGER!

Life-threatening danger if restarted without authorization

When disassembling there is danger of the energy supply being switched on inadvertently. This poses a life-threatening hazard for persons in the danger zone.

- Prior to starting the tasks switch off all energy supplies and safeguard them from being switched on again.

WARNING!

Danger of injury due to falling components!

When mounting components can fall and cause severe injury and material damage.

- Two people are always required for this task.
- Use a crane.
- For assembly on a vertically suspended spindle always use a suitable mounting aid.

DANGER!

Risk of injury by released energy!

Risk of injury during the disassembling of the balance weight due to released energy.

- Pay attention to the safety instruction during the disassembly of the stroke limit screw.

WARNING

Risk of injury due to stored energy!

The clamping device can be designed with disc springs. These disc springs are under permanent tension! The release of the stored energy can cause injuries!

- By loosening the corresponding screws they have to be operated continuously alternately to reduce the clamping pressure to a minimum!
- Particularly cautious approach is required!
- For cleaning and maintenance disassemble the clamping device from the machine!
- Always wear personal protective equipment!

WARNING!

Danger of injury due to vertical suspended spindle!

Bending into the machine work are when assembling overhead can cause severe head injuries.

- Secure components prior to overhead assembly.
- For assembly on a vertically suspended spindle always use a suitable mounting aid.

7.1.1 Disassembling the jaws

- Special tools required:
  - Allen wrench

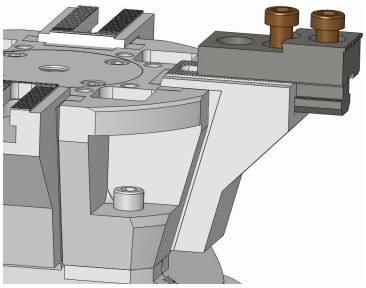


Fig. 32

1. Loosen the screws.
2. Pull out each opposing pair of jaws from the base jaws.

7.1.2 Disassembling the chuck

- Special tools required:
  - Allen wrench

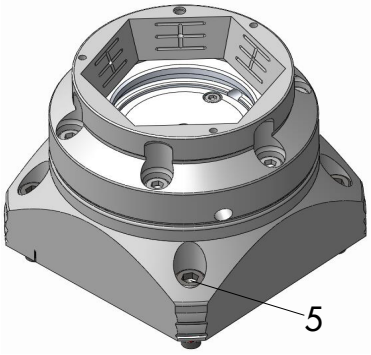


Fig. 33

1. Loosen and remove the cylindrical screws [5].
2. Remove the chuck from the standard draw unit.

7.1.3 Disassembling the mandrel

- Special tools required:
  - Allen wrench

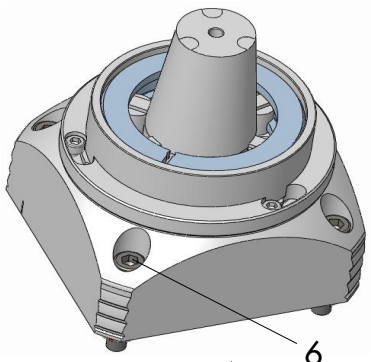


Fig. 34

1. Loosen and remove the cylindrical screws [6].
2. Remove the chuck from the standard draw unit.

7.1.4 Disassembling the clamping device

- Two people are required for this task.
- Always use a crane.
- Special tools required:
  - Crane
  - Wrench

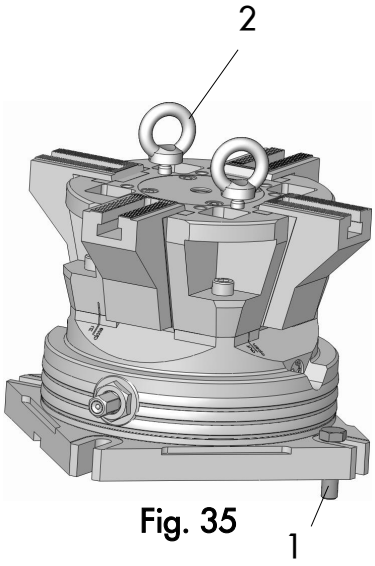


Fig. 35

1. Put the machine in set up mode.
2. Disassemble the jaws [see »Disassembly the jaws«].
3. Loosen and remove the cylindrical screw [1] by using a wrench.
4. Screw in the eye bolts [2].
5. Lift the clamping device from the machine table by using a crane and place it safely.
6. Wipe off the mating surfaces of the machine table with a soft, lint-free cloth and remove all oil and grease residues.

7.2 Subsequent storage of the clamping device

The clamping device must be cleaned and treated with corrosion protection for subsequent storage [see section »Cleaning«].

NOTE!

The storage conditions are specified in the section »Transport, packaging and storage«.

7.3 Disposal

If a return or disposal agreement has not been concluded, then recycle disassembled components.

NOTE!

Composite materials!

For disposal clamping devices which include composite materials [mineral cast, CFK] must be returned at HAINBUCH!

Risk of injury due to leaking fluids!

Hydraulically or pneumatically operated clamping devices may contain residues of liquids. Uncontrolled leakage of fluids can lead to severe injuries.

- Open the pressure relief screw and drain remaining liquid.
- Discard the liquid.

NOTE!

Improper disposal causes environmental damage!

Lubricants and other auxiliary materials are subject to treatment as special waste, and should only be disposed of by approved specialist companies!

Local municipal authorities or specialized disposal companies provide information on environmentally-responsible disposal.

8 Maintenance

Environmental protection

Comply with the following instructions for environmental protection when performing maintenance work:

- At all lubricating points where lubricant is applied by hand, remove escaping, used, or excess grease, and dispose of it in accordance with applicable local regulations.
- Collect used oil in suitable containers and dispose of it in accordance with applicable local regulations.

8.1 General

Cleanliness of the appropriate end-stop as well as the guidance diameters are conditions for reaching the concentricity and perpendicularity tolerances. Clean these surfaces with an appropriate cleaner.

CAUTION

Danger of injury due to improper handling of cleaners!

Improper handling of cleaners can cause health impairments.

- Always comply with the safety data sheets and guidelines provided by the manufacturer of the cleaning agent for handling/using the cleaners.

CAUTION

Danger of injury due to loss of clamping force!

Fouling of the clamping device can cause the clamping device to lose considerable clamping force.

- Always comply with the maintenance and cleaning intervals specified in this manual.
- In conjunction with the maintenance intervals, regularly check the maintenance status of the clamping device through clamping force measurements.

NOTE!

Material damage due to use of the wrong cleaning agent/cleaner!

Seals and clamping elements can be damaged due to use of the wrong seals and clamping elements.

- Do not use any solvents that contain ester or polar solvents for cleaning purposes.

Risk of injury!

Slipping while the lubricating with a grease gun can lead to severe cuts!

WARNING

Risk of injury due to stored energy!

The clamping device can be designed with disc springs. These disc springs are under permanent tension! The release of the stored energy can cause injuries!

- By loosening the corresponding screws they have to be operated continuously alternately to reduce the clamping pressure to a minimum!
- Particularly cautious approach is required!
- For cleaning and maintenance disassemble the clamping device from the machine!
- Always wear personal protective equipment!

NOTE!

Damage of seal rings and segmented clamping bushing!

Do not use ester-containing solvents or polar solvents for cleaning the clamping device. Seals and clamping elements could be damaged.

8.2 Cleaning

NOTE!

Material damage if cleaned with compressed air!

Cleaning the clamping device with compressed air can force metal chips into thread and grooves. This can damage or even destroy the clamping device.

- Never clean the clamping device with compressed air!

- Auxiliary material required:
  - Ester-free, non-polar cleaning agent
  - Soft, lint-free cloth

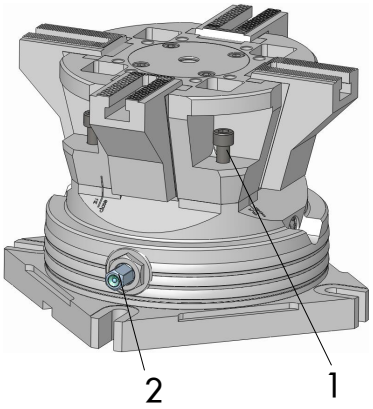


Fig. 36

1. Loosen and remove the screws [1].
2. Turn the actuating screw [2] to the left to move the actuating unit into release position.

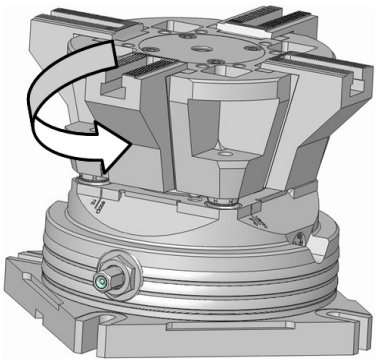


Fig. 37

3. Turn the clamping unit by 90° from marking »ZU« to marking »AUF«.
4. Remove the clamping unit.

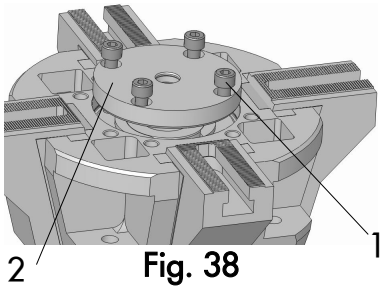


Fig. 38

5. Loosen and remove the screws [1].
6. Remove the base end-stop [2].

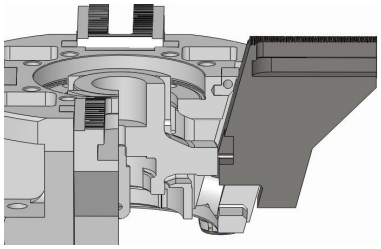


Fig. 39

7. Pull out the opposite pair of base jaws up out of the clamping unit.

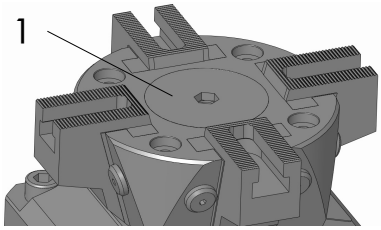


Fig. 40

8. Loosen and remove the stroke limit [1].

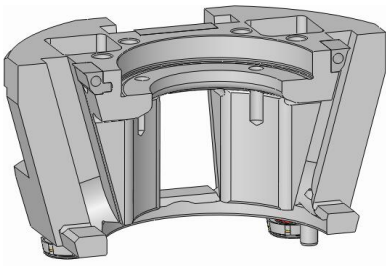


Fig. 41

9. Remove the bayonet adapter [1] downwards out our the housing.
10. Clean all the components listed below with cleaning agent and a cloth; remove all oil and grease residues:
    - Actuating unit
    - Clamping unit
    - Jaws [optional]
    - bayonet adapter
    - base end-stop
    - cylindrical screws

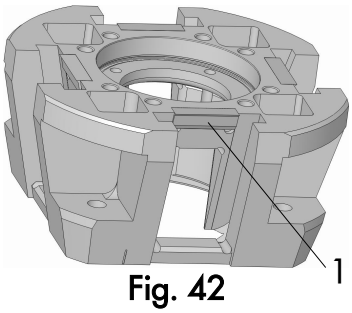


Fig. 42

11. Check all seals [1], if necessary clean or replace them.
12. Check the CENTREX, all 6 balls must be there!

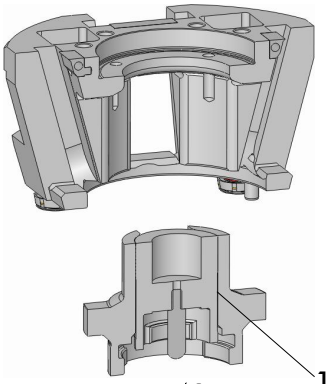


Fig. 43

13.Push the bayonet adapter [1] from the down side into the housing till end stop.

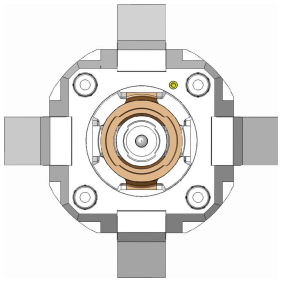


Fig. 44

Place the adapter, that one wing of the adapter shows to the side of the bolt!

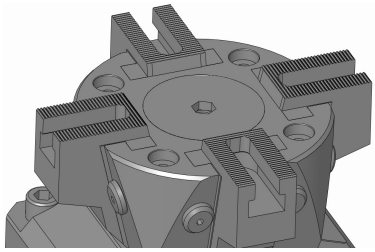


Fig. 45

NOTE!

Material damage due to wrong assembly!

With wrong assembly a problem with the face run may occur.

- When assembling the stroke limit make sure that the screws are tightened with the correct tightening torque!

14.Screw in the stroke limit [1], tighten it firmly with 25 Nm and stick it together with medium strength.

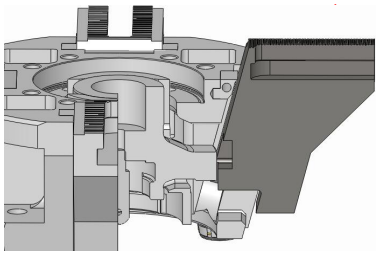


Fig. 46

15.Plase the opposite pair of base jaws on the tob of the guiding.

CAUTION!

Risk of squeezing danger due to moving parts!

When inserting the jaws the seal must be lifted.

16.Push the base jaws till stop downwards into the clampin g unit. The wings of the bayonet adapter must gear into the nuts at the jaws.

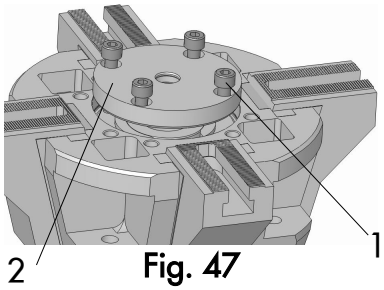


Fig. 47

17. Put the base end-stop [1] on the clamping unit.
18. Screw in the screws [1] and tighten them firmly with the correct tightening torque.

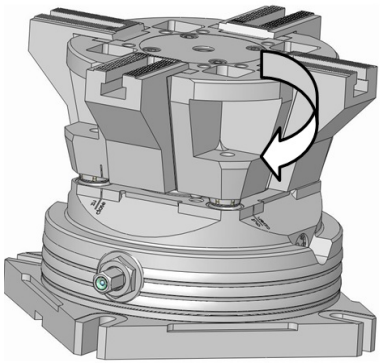


Fig. 48

19. Put on the clamping unit.
20. Turn the clamping unit by 90° from the marking »AUF« to the marking »ZU«.

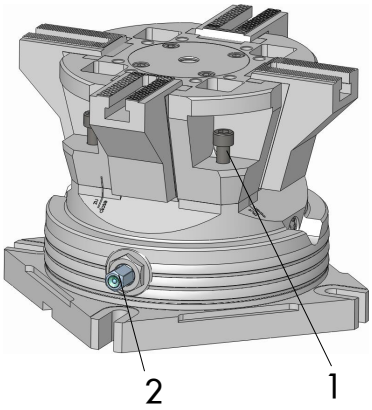


Fig. 49

21. Turn the actuating screw [2] to the right to move the actuation unit into clamping position.
22. Screw in the screws [1] and tighten them firmly with the correct tightening torque.

8.3 Preservation

- Special tools required:
  - Universal grease 2085/0003
  - Grease gun
  - Oil stone
  - Soft, lint-free cloth

1. Disassemble the clamping device [see section »Cleaning«, 1-8].
2. Clean the clamping device [see section »Cleaning«, 9-11].
3. Lightly grease all allen screws. Remove excess grease with a cloth.

> **!** For subsequent storage tightening the allen screws hand tight suffices. This facilitates re-commissioning and protects the allen screws.

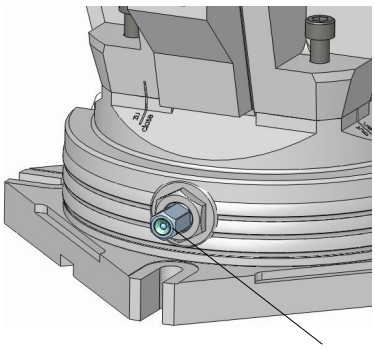


Fig. 50

4. Remount the clamping devices. [see section »Cleaning«, 12-20].
5. Use the lubricating nipples [1] to grease the clamping unit with a grease gun and universal grease.
6. Lightly grease all interior and outer surfaces of the clamping device. Remove excess grease with a cloth.
7. Pack the clamping device airtight in foil. Place it on a level, impact-free storage location and safeguard it from falling.

8.4 Use of lubricant

With the usage of lubricant you may only use grease that corresponds to the requirements concerning bond, pressure-stability and solubility in lubricating coolant.
In addition no dirt particles may be in the grease; they cause run errors if they come in in-between two mating surfaces.
We recommend for this the following lubricant:

HAINBUCH grease

see product information

Alternatives:

Lubricant	Manufacturer	Product
Universal grease	MicroGleit	GP 355
	Klüber	QNB 50
	Zeller & Gmelin	DIVINOL SD24440
	Bremer & Leguill	RIVOLTA W.A.P.
Special grease	Klüber	MICROLUBE GL 261

8.5 Maintenance schedule

Maintenance tasks are described in the sections above that are required for optimal and trouble-free operation.

If increased wear is detected during regular inspections, then reduce the required maintenance intervals according to the actual indications of wear.

Contact the manufacturer, [see the service address on the back] if you have questions concerning maintenance tasks and intervals.

Interval	Maintenance task
Daily	Visual inspection and complete cleaning in case of heavy contamination [see section »Cleaning«]
Weekly	Clean the clamping unit [see section »Cleaning«]
	Grease the clamping unit [see section »Preservation«]
Every 6 months	Completely disassemble and clean the clamping unit [see section »Cleaning«]

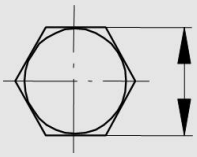
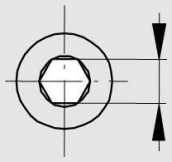
! For proper operation of the coolant feed a prefiltering with duplex filter (mesh size 100 µm, PI 3754] is necessary. The duplex filter is mounted on the coolant cleaning system.

8.6 Bolt torque

Metric ISO thread

The guide values for bolt tightening torque for achieving the highest permissible pre-tension for metric ISO thread are specified in Nm in the table.

- Total friction coefficient μ_{tot} = 0,12
- 90% utilization of the apparent limit of elasticity

Diameter	 [mm]	 [mm]	Torque for screw quality 10.9 [Nm]
M 4	7	3	4
M 5	8	4	7
M 6	10	5	12
M 8	13	6	25
M 10	17	8	50
M 12	19	10	100
M 16	24	14	220
M 20	30	17	400
M 24	36	19	600

The table shows the maximum permissible values and does not include any other safety factors. Knowledge of the applicable guidelines and configuration criteria are the prerequisites.

9 Trouble shooting

Possible fault causes and the tasks to correct these faults are described in the following section.

If faults occur more frequently, the maintenance intervals must be shortened to correspond to the actual system load.

Contact the manufacturer if there are faults that cannot be corrected by following the instructions below; see the service address on the back of this operating instruction.

9.1 Safety

Trouble shooting

The following always applies:

1. For faults that pose a direct danger for personnel and or property immediately execute the emergency-stop function.
2. Determine the cause of the fault.
3. If correction of the fault requires work in the danger zone, put the machine in set-up mode.
4. Immediately inform the responsible parties at the installation site of the fault.
5. Depending on the type of fault, either have authorized specialized personnel correct the fault, or correct it yourself.

   The trouble shooting table provided below lists personnel who are authorized to correct the fault.
6. If there is a fault that was not caused by the clamping device the cause of the fault may be in the machine area. See the operating manual for the machine in this regard.

9.2 Trouble shooting table

Fault	Possible cause	Fault correction	Corrected by
Clamping unit cannot be changed	Safety screw not loosened.	Unscrew the safety screw a bit [see section »Disassemble the clamping unit«].	Specialist
Clamping device does not open or release stroke is insufficient	Fouling between the draw mechanism and the clamping unit	Remove the clamping unite, move the draw tube back and clean the coupling area [see section »Disassembling the clamping unit«].	Specialist
	Dimensional deviation of the draw tube adapter	Check the dimensions of the draw tube adapter and correct them if necessary.	Specialist
Clamping force is too low	Work piece is over-dimensioned	Replace with a suitable clamping unit	Specialist
	Insufficient hydraulic pressure on the clamping cylinder	Check the machine side hydraulic aggregate	Hydraulic specialist
	Defective clamping cylinder or blocked draw tube	Contact the machine manufacturer	Machine manufacturer
Eccentric dimensional deviation on the work piece	Concentricity error of the segmented mandrel	Check the concentricity at the taper of the segmented mandrel, correct if necessary [see section »Checking and adjusting the face run and the concentricity«].	Specialist

Fault	Possible cause	Fault correction	Corrected by
Dimensional deviation on the work piece	Contaminated coupling area	Clean the coupling area of the clamping device [see section »Cleaning«].	Specialist
	Contaminated clamping taper	Disassemble the clamping unit and clean the clamping taper [see section »Cleaning«].	Specialist
Formal defect on the work piece	Elastic deformation of feedstock that is subject to formal defects. After machining the workpiece returns to its original form.	Use feedstock with fewer formal defects. If technically justifiably reduce the clamping pressure.	Specialist
Marks on the clamping surface	Point or linear work piece clamping	Replace with a clamping unit that has a smoother clamping surface	Specialist
	Excessive dimensional difference between the work piece diameter and the clamping bore	Replace with a clamping unit that has a suitable clamping bore	Specialist

9.3 Start-up after corrected fault

After correcting the fault execute the following steps to start up again:

1. Reset the emergency-stop device
2. Acknowledge the fault on the machine tool controller
3. Ensure that no one is in the danger zone
4. Start the machine tool

10 Appendix

10.1 Service Hotline

Order Hotline

Quickly ordered and delivered. A call is all it takes:
+49 [0]7144. 907-333

Schedule Hotline

Current status of your order? Just call:
+49 [0]7144. 907-222

24h emergency call

Has there been a crash or other technical emergency?
Our experts are at your service around the clock:
+49 [0]7144. 907-444

10.2 Representatives

The sales partners and service employees listed below are available for further consultation or support.

Overview of German postal codes:

Mi	010 – 049	Si	350 – 369	Hen	560 – 569	Rd	730 – 739	Fs	880 – 899
Sl	060 – 089	Bs	370 – 399	Re	570 – 599	Ti	740 – 749	Sb	900 – 919
Mii	090 – 189	Ft	400 – 479	Si	600 – 659	He	750 – 799	Hs	920 – 949
Wt	190 – 289	Bo	480 – 499	Ti	660 – 699	Hs	800 – 819	Sb	950 – 969
Bs	290 – 319	Ft	500 – 549	Rt	700 – 709	Gg	820 – 829	Si	970 – 978
Bo	320 – 339	Hen	550 – 559	Rt	710 – 719	Hs	830 – 859	Ti	979
Bs	340 – 349	Si	400 – 479	Fs	720 – 729	Gg	860 – 879	Sl	980 – 999

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